



# SCHOOL OF ECONOMICS AND MANAGEMENT

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## **The Relationship between Economic Development and Female Labor Force Participation within the Framework of U-Shaped Hypothesis:**

### **Evidence from Turkey**

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## **Abstract**

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This study discusses the effects of economic development on female labor force participation rates in Turkey in 1980-2000 within the framework of U-shaped hypothesis. In addition to the effects of economic development, other determinants of female labor force participation are also analyzed in five different econometric models. Descriptive statistics including time series evidences are exhibited in order to outline the reasons of the differences in female labor force participation rates in Turkey. The effects of economic development, different unemployment patterns, urbanization rate and total fertility rate on female labor force participation are found to be negative. On the other hand, it is found that education and agricultural share in the employment have positive effects on female labor force participation. Female labor force participation rate was 72.0 percent in 1955, 26.6 percent in 2000 percent and 24.4 percent in 2007. Time series evidence proves the existence of considerable slowdown in the decline of female labor force participation rates. Both econometric models and time series evidences suggest that Turkey is still experiencing the downward portion of U-shaped, may be, due to being at the early stages of economic development. Hence, Turkey is expected to lie on the upward portion of U-shaped in the following decades.

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Keywords: Female labor force participation, fixed effects model, U-shaped hypothesis, economic development, Turkey

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## 1. Introduction

### 1.1 Background

Female labor force participation rates vary among countries, and it is widely believed and witnessed that female labor force participation rates are relatively high in developed countries. In contrast, developing countries, such as Turkey, has been experiencing lower female labor force participation rates in the last decades; i.e. in 2007, female labor force participation rate was 24.4 percent in Turkey<sup>1</sup>; while, in 1955, it was 72 percent.<sup>2</sup> On the other hand, average female labor force participation rates in developed economies and European Union was 52.7 percent, 26.1 percent in North Africa and 33.3 percent in Middle East.<sup>3</sup> One might ask the plausible reasons of significant differences in female labor force participation rates among the countries; moreover, one might ask the reasons of this drastic decline in female labor force participation rates in Turkey in 1955-2007.

That rapid change of female labor force participation rates in developing and developed countries has contributed economists to pursuit of analyzing the evolution of female labor force participation in cross-countries. Beginning from the study of Sinha (1967)<sup>4</sup>, we have been still witnessing the substantial increase of analyses which are attempting to explain the issue of female labor force participation; thereby, focusing on revealing the factors that promote and hinder female labor force participation. U-shaped female participation curve is the well-known hypothesis which delves into female labor force participation. The existence of U-shaped female participation curve has been analyzed and documented by many economists.<sup>5</sup> U-shaped hypothesis, simply, exhibits the relationship between economic development and female labor force participation and it is suggested that female labor force participation rates first decline, and then rise as the country develops. Apart from that, it is suggested that, other conditions, such as labor market conditions and household characteristics also affect the female labor force participation. Among these, educational attainment, unemployment rate, urbanization rate and industrial mix are the remarkable determinants of female labor force participation.

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<sup>1</sup> TURKSTAT, The results of Household Labor Force Survey (2008)

<sup>2</sup> According to results of population census, State Institute of Statistics.

<sup>3</sup> ILO (2008) Global Employment Trends for Women, [www.ilo.org](http://www.ilo.org)

<sup>4</sup> Sinha (1967) is the first economist who suggested the existence of U-Shaped curve

<sup>5</sup> For instance, see, Psacharopoulos and Tzannatos (1989), Schultz (1991), Goldin (1995), Kottis (1990) and Tansel (2001).

## **1.2 Aim of the Study**

The aim of this study is to investigate the relationship between economic development and female labor force participation in Turkey in 1980-2000 within the framework of U-shaped hypothesis, and it is also aimed to outline the possible reasons that might promote and hinder female labor force participation. In order to analyze the issue of female labor force participation, descriptive statistics including time series evidence and panel data analysis of the provinces are used. By doing so, we will be able to understand the relationship between economic development and female labor force participation in Turkey.

## **1.3 Disposition**

After this brief introduction, second section will be literature review; it is devoted to explain the U-shaped hypothesis and examine previous studies about female labor force participation. Afterwards, descriptive statistics will be presented in section 3; hence, the difference in female labor force participation rates by different categories, such as by geographic location, by educational attainment, by age group, by marital status and by economic activity, will be presented. Then data and methodology section follows respectively. In section 6, the existence of U-shaped participation curve and determinants of female labor force participation will be analyzed by employing 5 different econometric models. The effects of these determinants will be shown in empirical results, section 7. Finally, concluding remarks and discussion will be the topics in the last section.

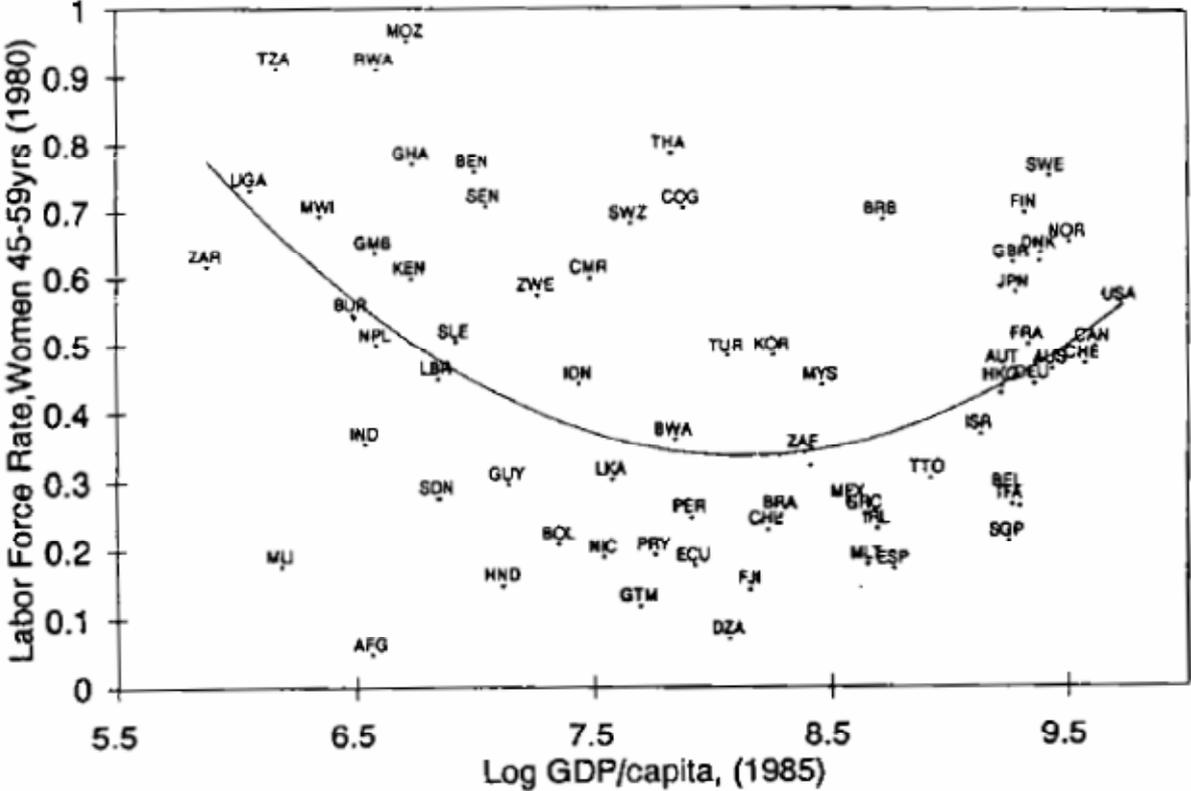
## **2. Literature Review**

### **2.1 Female Labor Force Participation and U-Shaped Hypothesis**

U-shaped female participation curve hypothesizes that agricultural sector is the dominant sector for female and male employment in developing countries and women are economically active due to large number of employment in agricultural sector, and female labor force participation rates are high. During the process of development, especially, at the initial stages of economic development, home-based production pattern changes to market oriented production pattern. Market oriented activities dominate home-based production, henceforth, the expansion of market oriented activities or introduction of new technologies lead to a decrease in female labor force participation. After a certain point, economic development requires more female labor, and demand for female workers will increase. Hence, female labor force participation

will increase (Goldin, 1995). Figure 1. shows a typical U-shaped female labor force participation curve. Female labor force participation rates lies on the vertical axis, and log GDP/capita lies on the horizontal axis.

Figure 1. U-Shaped Female Labor Force Participation Curve<sup>6</sup>



Source: Goldin (1995)

U-shaped female participation curve has been analyzed and documented by many economists.<sup>7</sup> Almost all of the studies about female labor force participation exhibit the existence of U-shaped female in the cross-country analyses.<sup>8</sup> It is suggested that less developed countries have high level of female labor force participation rates. Since agricultural activities play important role, women in these countries employed as unpaid family workers, therefore female labor force participation is relatively high in less-developed countries. On the other hand, developing countries<sup>9</sup> have the lowest female labor force

<sup>6</sup> Figure 1. is taken from the study of Goldin (1995)  
<sup>7</sup> For instance, see, Sinha (1967), Psacharopoulos and Tzannatos (1989), Schultz (1991), Goldin (1995), Kottis (1990) and Tansel (2001).  
<sup>8</sup> According to Durand (1975) U-shaped female participation curve is not valid for all countries; hence, he does not represent a general pattern for developing countries.  
<sup>9</sup> Sometimes it is called as middle-income countries.

participation rates. In an extreme example, developed countries have the highest female labor force participation rate (Pampel and Tanaka, 1986; Psacharopoulos and Tzannatos, 1989).

Kottis (1990) stressed that with the expansion of new market activities, employment opportunities for females are reduced and this decreases the probability of entering the labor market for females. That discouraging effect hinders female labor force participation rates. According to Pampel and Tanaka (1986), exclusion of women from labor market is in accordance with the theory of women in development.<sup>10</sup> The major reasons of this exclusion are due to gender discrimination, physical limitations or less educational attainment. Culture, social custom, employer preferences and household responsibilities may also impede female labor force participation at the early stages of development (Tansel, 2001).

Cross-country evidence shows that developing countries are experiencing a decrease in female labor force participation rates because of urbanization and non-agricultural production. That is why, these developing countries lie on the downward portion of U-shaped curve. On contrary, developed countries lie on the upward portion of U-shaped curve. Goldin (1995) suggested that education is one of the major factors for experiencing the upward portion of U-shaped curve. When the female education goes beyond elementary school levels, i.e., secondary school levels, women can easily access the positions in the white-collar jobs; hence, female labor force participation rate will increase. Kottis (1990) outlines this issue from supply and demand side of labor; he claims that the more acceleration has the economic development, the more demand for female labor will be in the market, therefore, the probability of entering labor market for females will rise. That will positively affect female labor force participation rates.

Pampel and Tanaka (1986) reconsidered the interaction between economic development and female labor force participation rates in their analysis. Because of employing energy use per capita as a measure of economic development, and including many set of explanatory variables, their study differs from previous studies. Their cross-country study reported that there exist a U-shaped relationship between economic development and female labor force participation. At the early stages of economic development, industrial structure hinders female labor force participation, but as time passes and the industrial structure improves, female labor force participation rate increases. In addition to the effect of economic development, they

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<sup>10</sup> For instance, see, Boserup (1970) for the theory of women in development.

found the effects of growth of labor force, family size, female education, labor force growth and economic dependency on female labor force participation (Pampel and Tanaka, 1986).

Kottis (1990) tried to examine the changes in inter-area variation in female labor force participation in Greece. He explained the changes in female labor force participation rate within the framework of U-shaped hypothesis. He estimated his models by using OLS method at two different times, for both 1971 and 1981. According to his findings, education and unemployment have the most influential effects on female labor force participation. One striking finding arises in his study; he found that education has negative effect on female labor force participation, that is, the coefficient of the variable of percentage of females who were uneducated have positive effect on female labor force participation rates. This finding might be attributable to widespread female employment in agriculture. Kottis (1990), further estimated the hidden employment of females, and he reported that there were great amount of underestimation of female unemployment in Greece. By quoting his words, we can understand the importance of hidden unemployment of females in Greece.

*“...the adjusted rate of unemployment was almost four times larger in 1971 and about two and half times larger than reported rate in 1981. This indicates a serious problem of hidden unemployment and underestimation of women’s unemployment.”* (Kottis, 1990: 130)

Psacharopoulos and Tzannatos (1989) also investigated female labor force participation from an international perspective. They used income, age, fertility, religion and education as explanatory variables. According to them the effects of variables are ambiguous except education. They concluded that since controlling education variable is more efficient than controlling other variables, educational policy should be the first to be applied in order to increase female labor force participation rates.

Tansel (2001) outlined the relationship between economic development and female labor force participation in Turkey by using time series evidences and cross-province estimates. She examined not only female labor force participation, but also non-agricultural labor force participation. Regarding female labor force participation and economic development, she estimated 4 different models by pooling the data of 67 provinces of Turkey for three years; 1980, 1985 and 1990.<sup>11</sup> In order to reveal the regional differences in Turkey, she used regional dummies and she found significant regional disparities in female labor force

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<sup>11</sup> She used Ordinary Least Squares Method (OLS) for estimation.

participation. Unemployment rate<sup>12</sup>, education, urbanization rate and industrial share are considered as the main determinants of female labor force participation in Turkey. In contrast to Kottis (1990), her calculations show that female illiteracy rate hinders female labor force participation. She also estimated the amount of hidden unemployment in Turkey, and her findings are in accordance with Kottis (1990) that urban female unemployment rate is underestimated and discouraged-worker effect is substantial. (Tansel, 2001: 31)

Lincove (2008) reconsidered U-shaped female participation curve by focusing on the interaction between growth, female education and female labor. His study replicates previous models using time-series analysis and consideration of large increases in female schooling over the past 30 year. He used both cross-section models and longitudinal models. He concluded that there is a negative relationship between economic growth and female labor force participation, that is, economic growth hinders female labor force participation. On the other hand, his longitudinal models suggests that this hindrance is not as big as previously thought, it also suggests that female schooling can increase female economic participation (Lincove, 2008: 65)

## **2.2 Female Labor Force Participation and Time Series Evidences**

U-shaped hypothesis has not been the only way for analyzing female labor force participation. Apart from U-shaped hypothesis, there are many analyses regarding female labor force participation using time series evidences or other approaches. Smith and Ward (1985) tried to reveal the reasons of the increasing female labor force participation rates in United States by using time series evidence beginning from 1900. They reported that there were strong positive relationship between the number of uneducated women and female labor force participation in 1900. This case was turned other way around between 1900 and 1940; as the acceleration of economic development increased, demand for educated women increased. It is a characteristic of developed economies; there is a positive association between female labor force participation and female education. According to their calculations, female labor force participation rate is 21 percent in 1900, 29 percent in 1950 and 52.1 percent in 1981.<sup>13</sup> They also emphasized the importance of real wages on female labor force participation. They claim that rising real wages accounted for 60 percent of the total growth of female labor force. (Smith and Ward, 1985)

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<sup>12</sup> She used female unemployment rates in three models and male unemployment rate in one model.

<sup>13</sup> Female labor force participation rates are not for a specific age group.

Ben-Porath and Gronau (1985) investigated the trends of female labor force participation rates in Israel. Female labor force participation rates increased between 1955 and 1980. They stated that there is a positive relationship between this rise and sharp decline in fertility and changes in family structure.<sup>14</sup> They also discussed the effect of education, concluding that schooling and female labor force participation are positively correlated. Apart from that, ethnicity is another important determinant for female labor force participation in Israel; i.e. in 1980, female labor force participation rate of Jewish women is 39.2 percent, whereas it is 11.8 percent for Arab women (Ben-Porath and Gronau, 1985).

Başlevent and Onaran (2004) analyzed the female labor force participation from a different perspective; they studied the effects of export-oriented growth on female labor force participation, especially, focusing on labor market outcomes in urban areas in Turkey. They found that export oriented growth is positively related with female employment. But they noted that export oriented growth has more effect on female labor force participation in the long run than in the short run. Moving out of traditional gender based division of labor can help females to reap the benefits of favorable macroeconomic conditions. (Başlevent and Onaran, 2004).

### **3. Descriptive Statistics**

This section aims to outline the trends of female labor force participation in different categories. Thus, five different categories will be examined, such as, labor force participation rates according to gender, educational background, age group, marital status and economic activity. Furthermore, it aims to explain the major factors affecting the trends in female labor force participation relying on the descriptive statistics. In the last part of this section, the reasons of females of not being labor force will be discussed.

#### **3.1 Gender and Labor Force Participation**

In this part, labor force participation rates according to gender will be shown using the data from Population Census results and Household Labor Force results.<sup>15</sup> In order to outline the trends in labor force participation according to gender three different categories are used. First, labor force participation rates are given for Turkey as a whole, and then gender differences between rural and urban areas are presented

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<sup>14</sup> Changes in family structure refer to a reduction in desired family size.

<sup>15</sup> Detailed information will be given in the data section.

Turkey has not experienced substantial undergone a transformation of its industrial base yet, and agriculture still plays crucial role for Turkish economy and most of women are employed in agricultural activities, usually as an unpaid family worker. Both men and women are employed equally in agricultural activities (Turkey Labor Market Study, 2006). Female labor force participation is considerably higher in rural areas than in urban areas owing to female employment patterns in agriculture. Therefore, it is necessary to reveal the facts about female labor force participation trends in urban and in rural areas.

### **3.1.1 In Turkey**

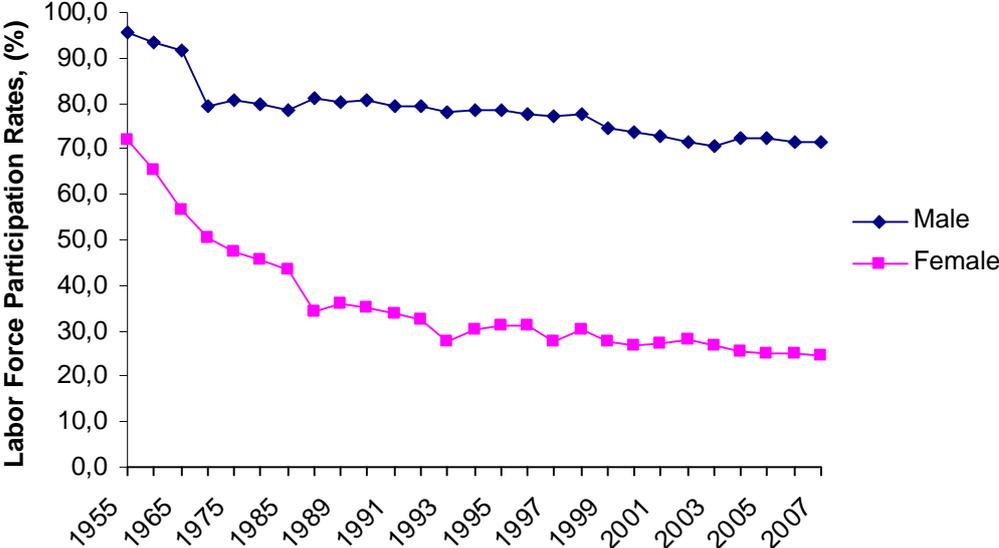
Figure 2. shows the trends in labor force participation according to gender in Turkey. It is easy to observe the decline in labor force participation rates for both males and females. It is a well-known issue that Turkey has low and declining level of labor force participation rates. Compared to OECD countries, Turkey has relatively low level of labor force participation rates. According to OECD outlook published in 2005, male labor force participation rate is 80.3 percent in OECD countries, whereas, it is 76.1 percent in Turkey. Female labor force participation rates in Turkey are much lower than OECD level, that is, 27 percent for Turkey, 60.1 percent for OECD countries.<sup>16</sup> Detailed information about labor force participation trends can be seen in Table 2. in Appendix 2. It proves the declining periods of male and female labor force participation trends in Turkey. To see an extreme example in Turkish labor market, we can compare the labor force participation rates in 1955 and 2007. In 1955, female and male labor force participation rates are 95.4 percent and 72 percent respectively. In 2007, they dropped to 71.6 percent and 24.4 percent, respectively. Even though, both men and women have experienced a decline in labor force participation rates, women have worsened more than men. It is also noticeable that there is a great amount of decline in female labor force participation rates in 1955-1990. After 1990, there has been a slowdown in the rate of decline in female labor force participation rates. In 1955, female labor force participation rate was 72 percent, in 1990, it was 35.3 percent, 26.6 percent in 2000 and 24.4 percent in 2007. This issue can be explained within the framework of U-shaped hypothesis. In these days, Turkey is experiencing the process of development, home-based production pattern has begun to change to market oriented production activities. But at the beginning of economic development, industrial structure hinders female labor force participation. Apart from that culture, social custom and household responsibilities of females may also affect female labor

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<sup>16</sup> For instance, see, OECD Employment Outlook 2005.

force participation. All of these impede female labor force participation. But as time passes, the industrial structure improves, and educational background of females, social custom and household responsibilities of females changes. These factors are expected to increase the female labor force participation rates in the following decades. Beginning from the last decades, Turkey has been experiencing these changes. Hence, it is expected that this stable decline in female labor force participation rate could be a step before being on the upward portion of the U-shaped.

**Figure 2. Labor Force Participation Rates by Gender, Turkey (%)**



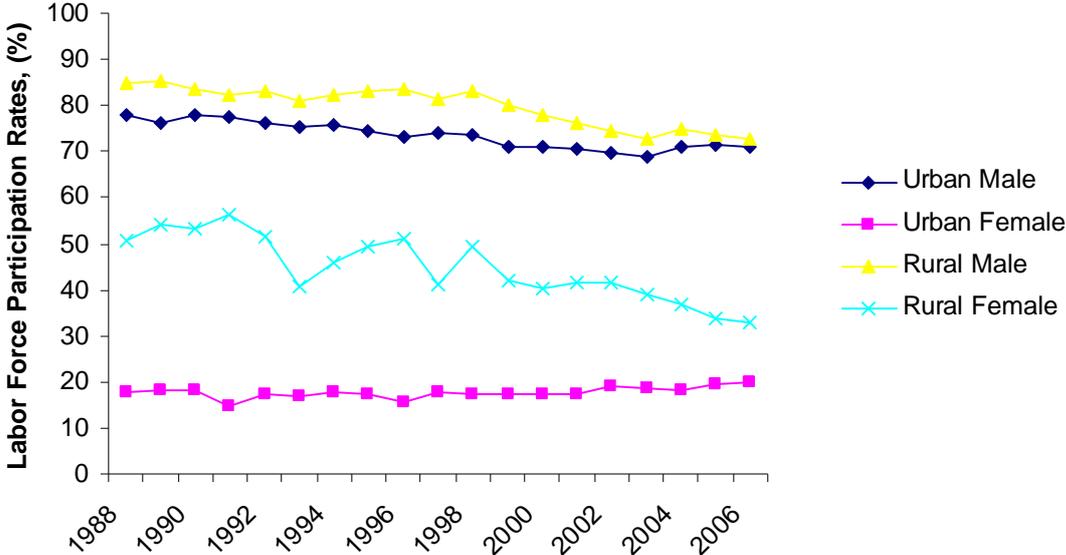
Source: TURKSTAT, Household Labor Force Survey Results

**3.1.2 In Urban and Rural Areas**

Due to unavailability of data for urban and rural areas, we can not show detailed the labor force participation rates as we have already did in previous part; we can only compare the rates between 1988-2007. Figure 3. exhibits differences in labor force participation rates according to gender and geographic location between. As expected, in rural areas, female labor force participation rate is much higher than in urban areas. They both declined to low levels, but in urban areas, it is still higher than rural areas. In rural areas, female labor force participation rate was around 50 percent in 1988, but it declined to 32 percent in 2007. it might be due to a change in employment structures. Table 9. shows that agriculture has 76.77 percent share for female employment in 1988, but in 2007 it became 47.20 percent. Furthermore, it is interesting to observe that female labor force participation rates in urban areas have not

experience a decline like in rural areas. On the contrary, after experiencing a decline until 2000, it began to rise to 20 percent level. It can be interpreted as experiencing the beginning of upward portion of U-shaped female participation curve. Kottis (1990) also found the upward move of U-shaped curve in urban areas, but not in rural areas in Greece. On the other hand, male labor force participation rates do not differ in a great amount in urban and rural areas, but still below OECD level.

**Figure 3. Labor Force Participation Rates by Gender and Location (%)**



Source: TURKSTAT, Household Labor Force Survey Results

**3.2 Educational Attainment and Female Labor Force Participation**

This section is devoted to reveal the effects of education on female labor force participation. As already emphasized in the literature review, education is one of the major determinants of female labor force participation for developing countries. Four basic education categories are used; these are woman i.) who is illiterate, ii.) who has educational attainment less than high school, iii.) who is graduated from a high school and iv.) who has higher educational attainment. Tansel (2001) used nine different education categories<sup>17</sup> in order to show the effects of education on female labor force participation. As the importance of agricultural activities diminishes for an economy, having a high level of education background will be a

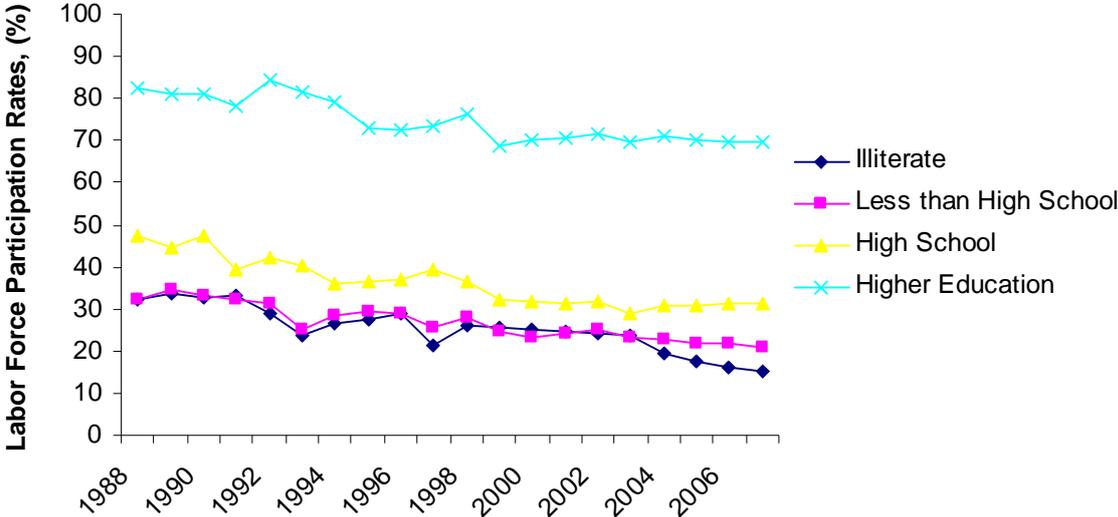
<sup>17</sup> These categories are; illiterate, literate-no-diploma, primary school, basic education, middle school, vocational middle school, high school, vocational high school, university.

must in order to get more earnings and have better employment opportunities. Table 4. and Table 5. in Appendix 2. prove the importance of education for female labor force participation.

**3.2.1 In Turkey**

Differences in female labor force participation rates by educational attainment in Turkey are shown in Figure 4. It is not surprising to see that females who are graduated from a higher institution have the highest participation rates. Moreover, there is big gap in labor force participation rates between females who have higher education background and who have high school education background. It should be noted that the decline in labor force participation rates also exist for those who have high level of educational background. Since this paper heavily concerns female labor force participation, we have not exhibit a table regarding male labor force participation rates by educational attainment, but it must be known that the role of education is more important for females than males. (Turkey Labor Market Study, 2006)

**Figure 4. Female Labor Force Participation Rates by Educational Attainment, Turkey (%)**

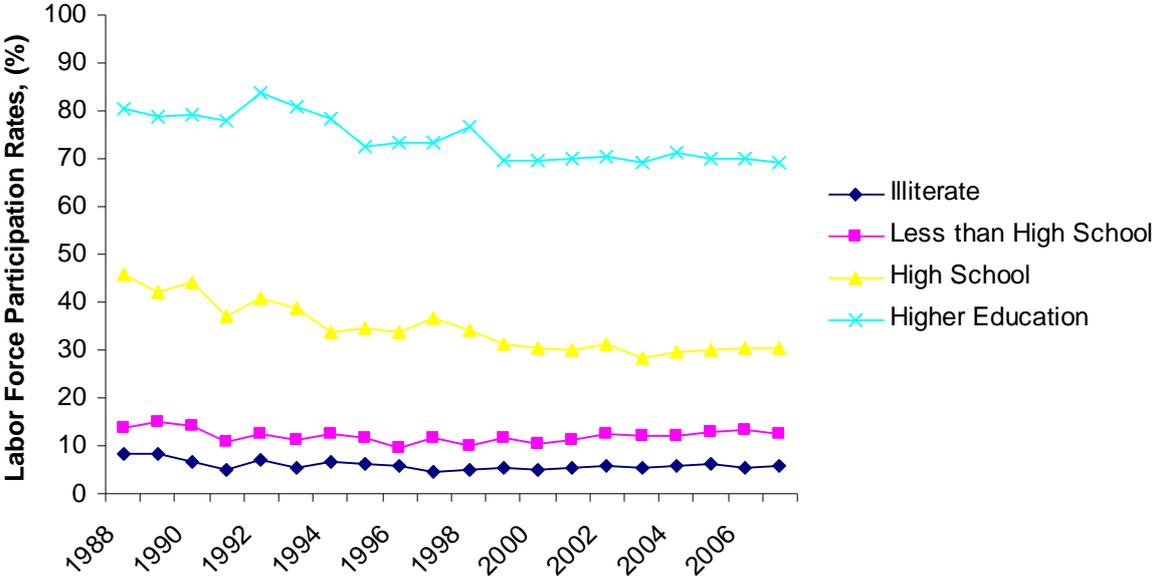


Source: TURKSTAT, Household Labor Force Survey Results

### 3.2.2 In Urban and Rural Areas

In this part, two different figures are introduced; Figure 5. shows the differences in female labor force participation rates by educational attainment in urban areas, and Figure 6. shows for rural areas. Detailed information about these rates can be seen in Table 5. in Appendix 2. Comparison of urban and rural areas underlines the role of education on female labor force participation. In 2007, female labor force participation rate is 5.9 percent for illiterate females in urban areas, while it is around 24 percent level in rural areas. As we have already stated in previous section, low educational attainment of females hinders the accessibility of jobs and demand for female labor in urban areas. Like the hindrance of illiteracy, educational level less than high school also affects female labor force participation rates in urban areas. Table 5. shows that in 2007, female labor force participation rate is 12.7 percent for females who have less than high school educational background, but 34 percent in rural areas.

**Figure 5. Female Labor Force Participation Rates by Educational Attainment, Urban (%)**

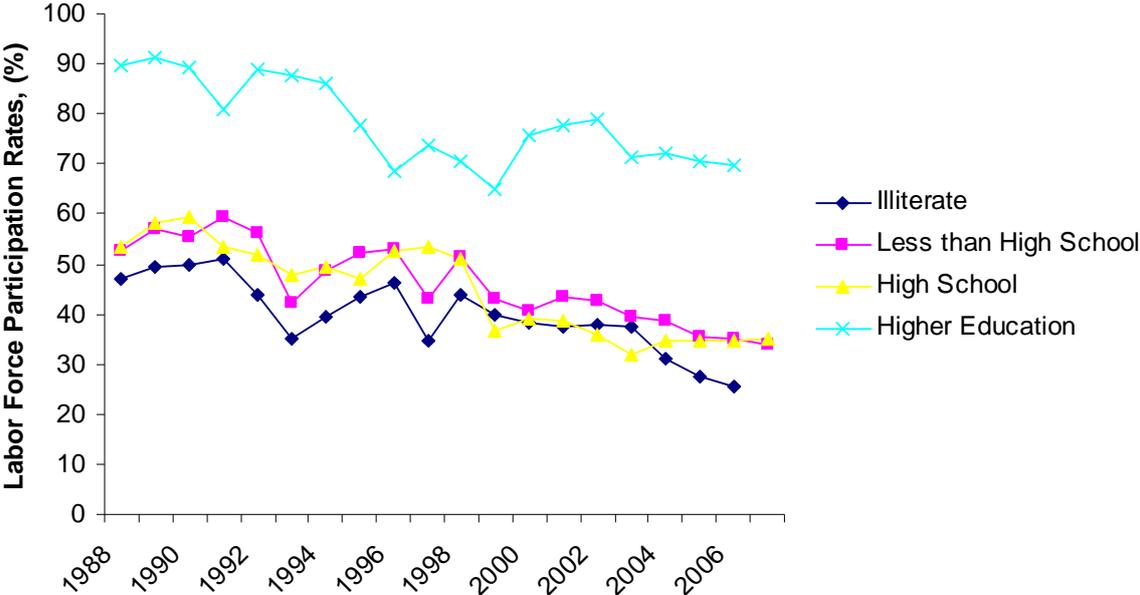


Source: TURKSTAT, Household Labor Force Survey Results

One can ask that why education has more impact on female labor force participation rates in urban areas than rural areas. Agricultural activities play important role for female employment in rural areas and most of those employed females are unpaid family workers, who has low level of education. On the contrary, in urban areas, agricultural activities are not as important

as in rural areas and unpaid female workers are relatively less than rural areas.<sup>18</sup> We can conclude that educational attainment has greater impact on female labor force participation in urban areas.

**Figure 6. Female Labor Force Participation Rates by Educational Attainment, Rural (%)**



Source: TURKSTAT, Household Labor Force Survey Results

**3.3 Age Group and Female Labor Force Participation**

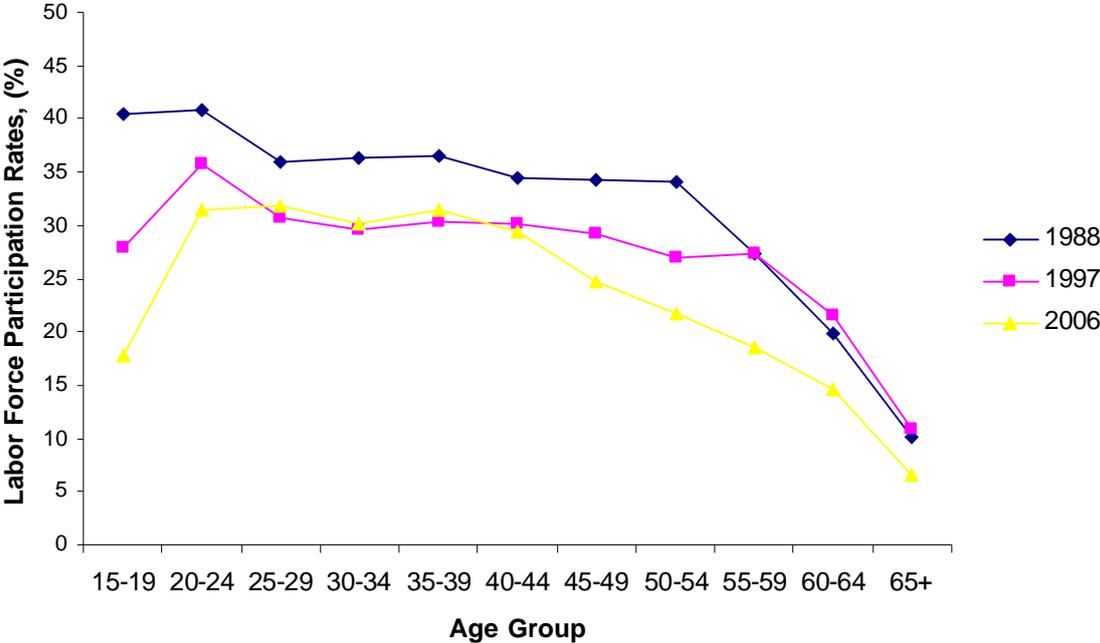
Figure 7. shows the difference in female labor force participation rates by age group. It also exhibits the decline in female labor force participation rates. 1988, 1997 and 2006 are the selected years in the figure.<sup>19</sup> The shape of female labor force participation rate curve is almost same for all selected years; it has increasing trend for 15-19 and 20-24 age groups, and reaches the highest level between the age interval 25 and 29. After this age interval, it begins to decrease slowly and reaches the bottom after 65 years old. The shape of this curve is expected, but female labor force participation rates are extremely low according to international comparisons for each age group. Female labor force participation rate for 15-24 age group is around 45 percent for OECD countries, but it is 26.1 percent in Turkey for the

<sup>18</sup> In October, 2007, the number of unpaid family workers in urban areas is 242,000. whereas, it is almost 2,000,000 in rural areas. Detailed information can be taken from [www.turkstat.gov.tr](http://www.turkstat.gov.tr)

<sup>19</sup> Figure 6. shows only female labor force participation rates for the selected years, in order to get detailed information see Table 6. in Appendix 2.

same age group. It is the same case for 22-54 age group; OECD average is 69.2, but it is 28.6 for Turkey.<sup>20</sup> One can easily realize the difference in female labor force participation rates if different years are compared. For example, in 1988, female labor force participation rate is 40.8 percent for the age interval 20-24; it is 31.4 percent in 2006 but for the same age interval. According to Bulutay (1995), this might be due to long years of schooling for young generations, if females get more education, they less likely to be in labor force. In 1988, more than around half million women were not in labor force because of being student, this number arose to 1.6 million in 2007.<sup>21</sup>

**Figure 7. Female Labor Force Participation by Age Group, Turkey (%)**



Source: TURKSTAT, Household Labor Force Survey Results

**3.4 Marital Status and Labor Force Participation**

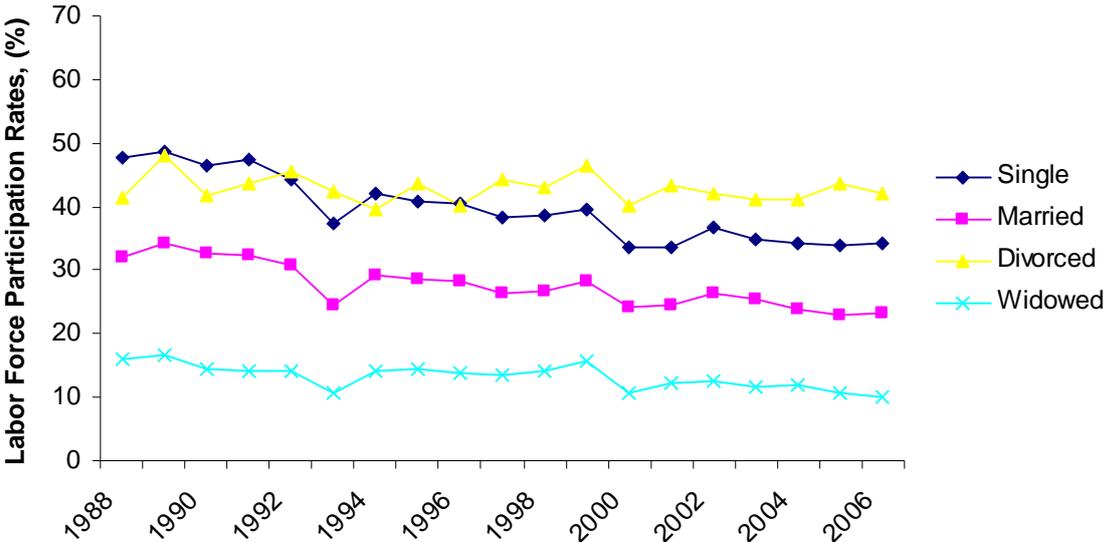
In this part, labor force participation rates according marital status will be shown. In order to show the effects of marriage on women and compare male and female employment in the labor market, male labor force participation rates are also considered. Due to limited amount of data, the difference in labor force participation rates by marital status and geographic location can not be revealed. Figure 8. exhibits the female labor force participation rates by

<sup>20</sup> For instance, see, OECD Employment Outlook 2005.

<sup>21</sup> For instance, see, [www.turkstat.gov.tr](http://www.turkstat.gov.tr)

marital status and Figure 9. exhibits the male labor force participation rate by marital status. If we compare the participation rates of married males and females by considering Table 7. and Table 8., it will be so easy to observe the negative effects of marriage on female labor force participation.

**Figure 8. Female Labor Force Participation Rates by Marital Status, Turkey (%)**



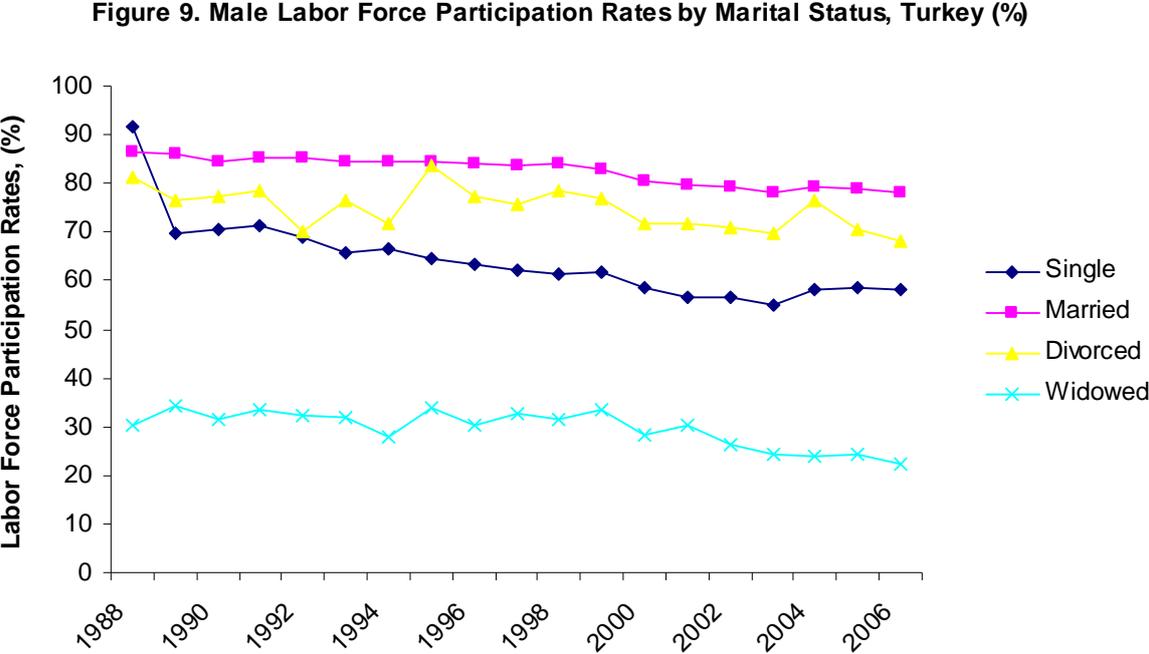
Source: TURKSTAT, Household Labor Force Survey Results

Let’s take the most recent values; say, in 2006, labor force participation rate for married females was 23.1 percent, it was 78.2 for married males. After widowed females, married females have the lowest labor force participation rates for this group. As Semyonov (1980) stated the married females devote themselves as a responsible for household activities, and; they are less likely to be in labor force. In OECD Employment Outlook (2008), the importance of gender on labor force participation was touched upon; by quoting a sentence from this outlook:

*“It is noticeable that employment performances of men and women are similar one year after school completion, but a gender employment gap emerges after that as marriage and motherhood begins to depress relative participation rates for young women.”*

Unlike the married females, single females have the highest labor force participation rates after divorced females; it was 47.8 percent in 1988 and 34.3 percent in 2006. For males, it is the other way around; labor force participation for single males was the lowest after widowed

males. We can conclude that marriage has positive impact on male labor force participation and negative impact on female labor force participation.



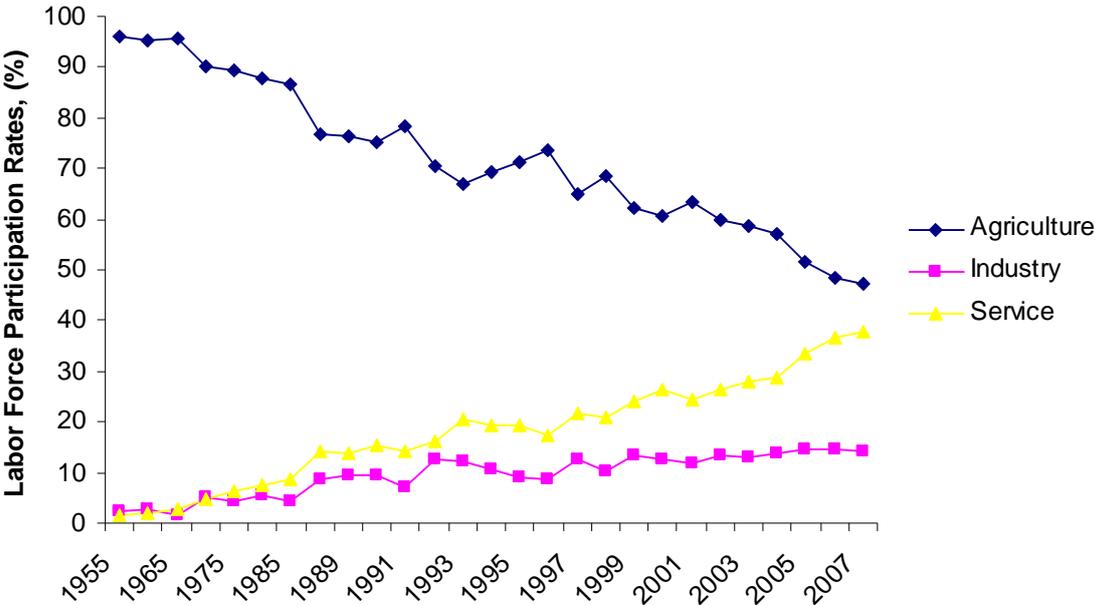
Source: TURKSTAT, Household Labor Force Survey Results

**3.5 Economic Activity and Female Labor Force Participation**

Table 9. in Appendix 2. points out employment shares by economic activity for both males and females. In 1955, agriculture dominates distribution of employment for both males and females; around 70 percent of male employment and 96 percent of female employment are owing to agriculture. In the same year, female employment is extremely low in industrial and service sector; 2.32 percent and 1.54 percent respectively. Especially, starting from 1988, structure of employment has changed drastically. In 1988, agriculture plays the second important role for male employment by 33.80 percent, but in 2007, it drops to 18.60 percent by reaching its lowest share in employment distribution. In 1988, agriculture dominates other sectors for the share of employment of females, that is, agriculture has 76.77 percent share, industry has 8.56 percent and service sector has 14.36 percent. In 2007, major role of agriculture in female employment has decreased to 47.20 percent; agriculture is still the first for female unemployment, but it does not dominate any other sector like it did in previous

years. Figure 10. shows the drastic decline in female employment in agriculture, and this drastic decline in female employment activities obviously hinder the female labor force participation rates. In the last decades, Turkey has rapidly begun to experience the transformation of its industrial base compared to 1955. As Kottis (1990) stated at the early stages of economic development significant changes in the manpower requirements of different sectors, especially, in industrial sector have negative impacts on female labor force participation; the need for manpower can drive females out of labor force. The impact of employment by economic activity is also considered in a paper reported by World Bank, hence, they stressed that changes in labor force participation rates in Turkey are closely related to the evolution in the structure of employment from 1988 to 2004.<sup>22</sup>

**Figure 10. Female Employment by Economic Activity, Turkey (%)**



Source: TURKSTAT, Household Labor Force Survey Results

**3.6 Reasons of not being in Labor Force**

In this part, the reasons of females of not being in labor force will be explained briefly. Table 10. in Appendix 2. shows the number of people who is not in labor force and the reasons of females of not being in labor force. Due to limited data, we can not present the data before 1988. Being a housewife, being a student, working seasonally, being retired, and being disabled and old are the main reason categories of not being in labor force. However, being a

<sup>22</sup> For instance, see, Turkey Labor Market Study, 2006.

housewife indicates the most important reason of females; in 1988 almost 9 million women were not in labor force due to being a housewife. In 2007 this number reaches its top level by 12.8 million. As we have already stated above, marriage is a hindrance for female employment; when female marry, they devote themselves as a responsible for household activities, and they become less likely to be in labor force (Semyonov, 1980). Another important reason of not being in labor force is owing to education. In 1988, roughly half million females were not in labor force due to being a student; this number has tripled in 2007, by reaching 1.62 million. Bulutay (1995) emphasized the impact of schooling on female labor force participation, due to long years of schooling for young generations, females less likely to be in labor force.

#### **4. Data**

Inaccessibility and unavailability of data of the provinces are the most serious problems and restrictions that have been faced in this study. Most of data in this study are complied from the provincial indicators (1980-2002) of State Institute of Statistics of Turkey; these are such as female labor force participation rates, urban population rate, total fertility rate, industrial employment, agricultural employment, all unemployment variables, female illiteracy rate and the percentage of women over 6 years old who completed primary school. Female mean years of schooling labor force are taken from Tansel and Gngr (1997).<sup>23</sup> For 1990 and 2000 Gross domestic product values of the provinces for 1990 and 2000 are taken from provincial indicators of State Institute of Statistics of Turkey, gross domestic product values of the provinces for 1980 are taken from Karaca (2004). Data used in the figures are taken from the results of household labor force survey.<sup>24</sup>

#### **5. Methodology**

In order to analyze female labor force participation rates and explain the variation in female labor force participation rates in regions and countries, economists used different estimation methods. Time series, cross-country estimates and panel data estimates have been used as an evidence to understand the variation of female labor force participation rates. Every model that has been used in previous studies has specific advantages and disadvantages. In cross-section estimates, the risk of bias can be arise due to couple of problems; multicollinearity is one of these

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<sup>23</sup> I am so grateful to Nil Demet Gngr for her consideration regarding data of female mean years of schooling in labor force.

<sup>24</sup> For instance, see, [www.turkstat.gov.tr](http://www.turkstat.gov.tr)

problems, it refers to the situation where there is either an exact or approximately exact linear relationship among the explanatory variables. Heteroscedasticity can be another important problem for cross-section estimates, that is, equal error variance, may not be always tenable in cross-section estimates (Gujarati, 2004). Pooling cross-section and time series data is considered better than using just cross-section estimates since it can increase the statistical power of the models by combining time-series data cross-section data. Moreover, pooled data can be estimated by using OLS but as Pampel and Tanaka (1986) stated there could be serious problems. These are, briefly, the causal processes must be constant across the separate panels and serial dependence of errors.<sup>25</sup>

Having, briefly, considered the advantages and disadvantages of the previous studies, I decided to use panel data regression model. In time series data the values of variables are observed over a period of time, in cross-section data values variables are gathered for sample units, at the same point in time (Gujarati, 2004). Contrary to time series and cross-section model, panel data regression models have two different dimensions, which are, time and space. Space dimension refers to countries, firms, products, etc. whereas time dimensions refers to periodical observations of the variables. Baltagi (2001) lists the following advantages of panel data:

- i. Contrary to time series and cross-section models, panel data suggests that countries, firms, products are heterogeneous and it controls heterogeneity so as not to take the risk of biased results. Time-series study or cross-section analyses are not able to control individual invariant and time invariant variables.<sup>26</sup>
- ii. Since panel data uses both cross-section and time series, panel data give more informative data, more variability, less collinearity among variables, more degrees of freedom and more efficiency.
- iii. Compared to time series and cross-section models, panel data can detect and measure errors better.
- iv. Panel data is much better and efficient for studying with more complicated behavioral models.

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<sup>25</sup> For instance, see, Pampel, F.C. ve K. Tanaka (1986) *Economic Development and Female Labor Force Participation: A Reconsideration*, Social Forces, 64(3): 599-619

<sup>26</sup> Baltagi (2001) gives an comprehensive example about heterogeneity. By quoting his example: “...studied the external debt repayments problems using a panel of 79 countries. These countries differ in terms of their colonial history, financial institutions, religious affiliations and political regimes. All of these country-specific variables affect the attitudes that these countries have with regards to borrowing and defaulting and the way they are treated by the lenders. Not accounting for his country heterogeneity cause serious problems.”

Taking the advantages of panel data that have been listed above, we can conclude that panel data can enrich the estimation in such ways that can not be possible if only cross-section or time series data are used. It should not be interpreted that there are no problems with studying panel data (Gujarati, 2004).

In panel data regression models, there are two different estimation methods; either fixed effects models or random effects models can be used. Fixed effects model relies on couple of assumptions that are made about the intercept, slope coefficients and the error term.<sup>27</sup> (5.1) is the most general form of panel data model, where,  $i$  represents individuals and  $t$  represents time. Basically, fixed effects model assumes that error terms are correlated with explanatory variables, on the other hand, random effects model assumes that error term and explanatory variables are uncorrelated (Gujarati, 2004).

$$Y_{it} = \alpha_i + \beta X_{it} + u_{it} \quad (5.1)$$

In this study fixed effects model is employed, and the assumption of “*slope coefficients constant but intercept varies across individuals*” is adopted. Eventually, we can write the following model, (5.2), by relying on this assumption. (Gujarati, 2004: 642)

$$Y_{it} = \beta_{1i} + \beta_2 X_{2it} + \beta_3 X_{3it} + u_{it} \quad (5.2)$$

Model (5.2) is known as the fixed effects regression model in the literature.<sup>28</sup> Intercept varies across individuals (in our model it refers to provinces) but slope coefficients of the individuals are constant and it is time invariant, and assumes that error terms are correlated with explanatory variables in the model. Fixed effects regression model is tested by using restricted  $F$ -test.<sup>29</sup> Restricted  $F$ -test is used in order to determine which assumption to choose; i) intercepts do not vary across provinces (common intercept), ii) intercept varies across provinces (fixed effects model). Restricted  $F$ -test suggests that fixed effects model is better method than another.

Restricted  $F$ -test (Gujarati, 2004: 643)

$$F = \frac{(R^2_{UR} - R^2_R) / (i-1)}{(1 - R^2_{UR}) / (n-k)} \quad (5.2)$$

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<sup>27</sup> In order to determine which model is more efficient Hausman Specification Test is used and as a results it is concluded that fixed effects model is much efficient than random effects model.

<sup>28</sup> Sometimes it is called as Least Squares Dummy Variables (LSDV) Model.

<sup>29</sup>  $F$ -test makes a choice between fixed effects model and pooled data estimation model.

*UR* refers to unrestricted model fixed effects model. *R* refers to restricted OLS model. It is restricted due to the fact that, it assumes all provinces' intercepts as common, furthermore,  $i$  is the number of provinces,  $n$  is number of observations,  $k$  is degrees of freedom. If  $F$ -calculated is greater than  $F$ -critic, we can conclude that fixed effect model is the proper model to choose. After restricted  $F$ -test is employed, and if we reject the null hypothesis; hence we conclude that fixed effects model is proper for estimation, we employ Hausman test in order or to make a choice between fixed effects model and random effects model.

## **6. Model**

We have been still witnessing differences in female labor force participation rates in cross-country analyses. Up to now, economists have tried to explain and pursue the factors that influence female labor force participation rates. Neoclassical approach, simply, suggests that the choice of entering labor market depends on income and leisure comparison. According to Becker (1965) female labor force participation is due to a joint decision making process; income and leisure comparison is embodied in order to increase the utility of the household; hence this model is named as the income-leisure model. Psacharopoulos and Tzannatos (1989) criticize that this model only examines labor supply in relation to wage and incomes by disregarding other conditions; such as household characteristic and labor market conditions. Besides, age, gender, ethnicity, marital status and income groups can also affect labor force participation rates. Bulutay (2000) indicates that income-leisure model of neoclassical approach is not valid at current time, especially for less-developed and developing countries. According to him, working and income are indispensable parts of human nature, furthermore, for most of people living in less-developed and developing countries there is not any option to choice between leisure and income.

I agree with Bulutay (2001) and Psacharopoulos and Tzannatos (1989) that income-leisure model can not be sole explanation of female labor force participation. Aim of the empirical model is to analyze and reveal the factors that promote and hinder the female labor force participation rates in Turkey. Like most of economist did, I use variables that can reflect household characteristic and labor market conditions. Thus, in order to analyze, firstly, the effects of economic development and then the effects of other variables representing labor market conditions and household characteristics on female labor force participation, five different models studied in this paper. In all models, the data are panel data of the 67 provinces of Turkey, in 1980, 1990 and 2000; hence, there are 201 total numbers of observations in each model. Dependent variable and explanatory variables of the model are explained below.

## 6.1 Dependent Variable

Female labor force participation rate is the only dependent variable of the models. Labor force participation rate is the ratio of labor force<sup>30</sup> to the overall population. Since our dependent variable is concerning female participation, we can define it as the ratio of female labor force to overall female population.<sup>31</sup> In all models, aim is to reveal the factors that promote and hinder female labor force participation rates, and outline the relationship between female labor force participation rates and economic development.

## 6.2 Explanatory Variables<sup>32</sup>

Explanatory variables used in all models are explained below, it should be noted that all of the variables used in the models represent provincial values.

*Female Labor Force Participation Rate:* is the ratio of females in labor force 12 years old and over to the total female population 12 years old and over.

*Industrial Electricity Consumption of per capita:* is the total industrial electricity consumption (Kwh) divided by provincial population.

*Gross Domestic Product per capita:* is the gross domestic product (of provinces) per capita.

*Urban Population Rate:* is the population who live in urban areas.

*Total Fertility Rate:* is the average number of live births that a woman would have under the assumption that she survived to the end of her reproductive life (15 to 49 years of age) and bore according to a given age specific fertility rate.

*Population Employed in Industry:* is the total number of people employed in industrial sector<sup>33</sup> divided by total employment (12 years old and over).

*Population Employed in Agriculture:* is the total number of people employed in agricultural activities<sup>34</sup> divided by total employment (12 years old and over).

*Unemployment rate:* is the ratio of unemployed population to the total labor force (12 years old and over).

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<sup>30</sup> Female labor force is the total of employed and unemployed but seeking job population.

<sup>31</sup> TURKSTAT adopts female overall population as the population 12 years of age and over. And unpaid family workers counted as employed.

<sup>32</sup> All of the explanatory variables used in the models are provincial values.

<sup>33</sup> Industry includes mining and quarrying, manufacturing, electricity, gas and water.

<sup>34</sup> Agricultural activities include agriculture, forestry, hunting and fishing

*Female Unemployment Rate:* is the ratio of unemployed women population to the total women labor force (12 years old and over).

*Male Unemployment Rate:* is the ratio of unemployed men population to the total men labor force (12 years old and over).

*Female Illiteracy Rate:* is the ratio of number of illiterate women (6 years old an over) to women population (6 years old an over).

*Primary Education:* is the percentage of women over 6 years old who completed primary school.

*Female Mean Years of Schooling:* *Mean years of schooling for female labor force (12 years old and over).*

Female labor force participation rates first declines and then rises as the country develops (Goldin, 1995). As discussed in the second section, most of advanced economies have experienced U-shaped hypothesis; after a certain point, female labor force participation rates begin to rise. One important question may arise at that point, that is, what is the criterion of measuring economic development. In the literature, economic development, basically, refers to an increase in economic wealth of the regions or countries. That is why most of studies regarding the relationship between female labor force participation an economic development used GDP or GNP<sup>35</sup> as a measurement of economic development. Apart from other economists, Pampel and Tanaka (1986) used energy use per capita as an indicator of economic development. Since they used cross-section analysis, gross national product per capita is less desirable because of oil producing nations (Pampel and Tanaka, 1986).

In this study, five different models are estimated. Formulation and explanation of all models will be explained in the following section. Industrial electricity consumption of per capita is used as a measurement of economic development in model 1, model 2 and model 3 and gross domestic product per capita is used in other models. Expected sign of the indicators of economic developments is minus, but square of them is expected to be plus.

Inaccessibility and unavailability of data of the provinces are one of the serious problems that have been faced in this study. Even though, models are somewhat restricted by lack of data, I use new and different data compared to previous studies concerning female labor force participation. In the literature, it is stressed that unemployment, educational attainment of the women,

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<sup>35</sup> GDP refers to gross domestic product and GNP refers to gross national product.

urbanization rate and industry mix of the region are the most important determinants of female labor force participation. In this paper, 14 different explanatory variables are used in order to explain the factors that could have an impact on female labor force participation. Moreover, other explanatory variables, such as growth rate, crude marriage rate, crude divorce rate, and percent of higher education female graduates are tested in the models but due to their insignificances, they are excluded from the models.

Unemployment rate is the basic determinant of female labor participation rates that describe labor market conditions. General unemployment rate, male unemployment rate and female unemployment rate are used in order to evaluate the different aspects of unemployment rates. In model 1 and model 2 general unemployment rate is used, in model 3 female unemployment rate is used and male unemployment rate is used in remaining models. All variables represent unemployment rate is expected to have negative impact on female labor force participation. High levels of unemployment rates tend to decrease the probability of females entering labor market; therefore, can induce to increase the number of discouraged female workers. By having driven out of labor market, female labor force participation decreases in the economy. On the other hand, unemployment rate may have positive effects on female labor force participation, but it is obvious that discouraged worker effect can dominate added-worker hypothesis (Kottis, 1990).

With regards to educational attainment of females, three different explanatory variables used; female illiteracy rate (used in model 2 and model 5), percentage of women over 6 years old who completed primary school (used in model 1 and model 4) and female mean years of schooling in labor force (used in model 1). Mincer (1958) and Becker (1964) claim that education is one of the most crucial dynamics of human capital investment. Theoretically, educational attainment has positive effects on female labor participation. Psacharopoulos and Tzannatos (1987) tried to explain the relationship between schooling and female labor force participation in 136 countries. Their result indicates that there is a positive relationship between education and female labor force participation; furthermore, they calculated that literate females enter labor market 54 percent more than illiterate females. Ben-Porath and Gronau (1985) also found positive impact of schooling on participation rates in Israel. In contrast to literature, in Kottis's (1990) paper, education has negative effect on female labor force participation, that is, the coefficient of the variable of percentage of females who were uneducated have positive effect on female labor force participation rates.

Another important determinant of female labor force participation is the urbanization rate. Urbanization rate refers to the population who live in urban areas. Kottis (1990) and Tansel (2001) point out the impact of urbanization rate on accessibility of jobs for females. Kottis (1990) concluded that urbanization rate in Greece had positive effect; whereas Tansel (2001) found that urbanization rate had negative effect on female labor force participation rates. Since agriculture plays crucial role in Turkish economy and most of females in rural areas are employed in agriculture as an unpaid family worker, urbanization rate is expected to have negative sign in the models. Urban-rural migration in Turkey has significant effect on female labor force participation and employment. That migration pattern induces ex-unpaid female family workers accounted as housewives in urban areas and driving them out of labor force; in the meantime, it has little impact on male participation rates (Başlevent and Onaran, 2004)

Total fertility rate is another explanatory variable used in the models. It is the average number of live births that a woman would have under the assumption that she survived to the end of her reproductive life (15 to 49 years of age) and bore according to a given age specific fertility rate.<sup>36</sup> Roughly, it can be said high level of fertility rates have negative impact on female employment. When fertility rate is high, females devote themselves as a responsible for household activities. That is why; they are less likely to be in labor force (Semyonov, 1980). Lim (2001) suggests that female labor force participation rates are increasing owing to the completion of the fertility transition.

As I mentioned above, agricultural activities perform crucial roles in Turkish economy and it still has significant effect on female employment. Percentage of female employment in agriculture is 96.14 in 1955, whereas, it drops to 47.20 percent in 2007. Even though it decreased by 50 percent, agriculture is still important for female unemployment. Therefore, the sign of that agriculture variable is expected to be positive. On contrary, the sign of industry variable is expected to be negative.

### **6.3 Formulation of the Models**

This part is devoted to illuminate the main research question of the study. Therefore, five different models are explained in this part. All models have great possibility and different aspects to ascertain the effects of different explanatory variables on female labor force participation rates. Time series evidence given in section 3 has already shed light on the decline in female

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<sup>36</sup> Even though it has general explanation, that explanation of total fertility rate is due to the explanation of TURKSTAT.

labor force participation rates. In addition to time series evidence, U-shaped hypothesis is also considered. Within the framework of U-shaped hypothesis, aim of five different models is to deepen this research, specifically, to focus on revealing the effects of economic development, different patterns of unemployment rates, total fertility rate, urbanization rate, industry mix, and educational attainment on female labor force participation. Moreover, comparing the effects of different explanatory variables on female labor force participation is also aimed.

In order to reveal and compare the effects of education on female labor force participation rates, 4 different models are employed. Model 1 and model 2 employs almost the same explanatory variable; only education variable is different variable in both models. Model 1 includes percentage of women over 6 years old who completed primary school as an education variable, whereas model 2 includes female illiteracy rate as an education variable. Thus, comparing the coefficient of education variables in two models, we can compare and therefore, analyze the effects of education on female labor force participation. Model 4 and model 5 has different explanatory variables than first two models, but as aimed in first two models, these models also aim to compare the effects of education on female labor force participation. This is done due to considering the impacts of using different variables on female labor force participation rates. In section 7 effects of all explanatory variables will be explained in detailed. Thus, it will be easy to make comparison between the impacts of different explanatory variables in female labor force participation rates.

Urban population rate and total fertility rate are the common explanatory variables in all models. Their impacts can be analyzed separately considering the effects of other variables in the models. Indicators of development, effects of different levels of education and different patterns of unemployment differ in all models. Industrial electricity consumption of per capita and gross domestic product per capita refers to measurement of development. General unemployment rate, male unemployment rate, female unemployment rate refers to compare the effects of different unemployment patterns. Likewise, female illiteracy rate, percentage of women over 6 years old who completed primary school and female mean years of schooling in labor force are used in different models in order to examine the impacts of education on female labor force participation. The variables of population employed in industry (%) and population employed in agriculture (%) are used the models so as to reveal the effects of industry mix of the country.

First two models are introduced below. As mentioned above, industrial electricity consumption of per capita and gross domestic product per capita are the measurements of economic

development. Since the existence of U-shaped hypothesis is pursued, square of industrial electricity consumption of per capita is also added, and it is expected to have positive sign. Besides, gross domestic product per capita is used as another indicator of development in the models. First two models resemble each other in many ways; they include same explanatory variables, such as development variables, urban population rate, total fertility rate, unemployment variable and agriculture variable. Education variables are the only variables that differ in the models. Hence, it gives us the possibility to compare the effects of education on female labor force participation rates. The results of model 1 and model 2 will be given in section 7.

#### *Model 1*

$$\Delta flfpr_{it} = \beta_{i0} - \beta_1 \log energy_{it} + \beta_2 (\log energy)_{it}^2 + \beta_3 \log gdpc_{it} - \beta_4 urpop_{it} - \beta_5 totfer_{it} \quad (6.1)$$

$$+ \beta_6 agricul_{it} - \beta_7 unemp_{it} + \beta_8 primary_{it} + u_{it}$$

#### *Model 2*

$$\Delta flfpr_{it} = \beta_{i0} - \beta_1 \log energy_{it} + \beta_2 (\log energy)_{it}^2 + \beta_3 \log gdpc_{it} - \beta_4 urpop_{it} - \beta_5 totfer_{it} \quad (6.2)$$

$$+ \beta_6 agricul_{it} - \beta_7 unemp_{it} - \beta_8 filliteracy_{it} + u_{it}$$

#### *Explanation of variables used in model 1 and model 2*

*flfpr*: female labor force participation rate.

*log energy*: natural logarithm of industrial electricity consumption per capita.

*(log energy)<sup>2</sup>*: square of the natural logarithm of industrial electricity consumption per capita.

*log gdpc*: natural logarithm of gross domestic product per capita.

*urpop*: urban population rate (%).

*totfer*: total fertility rate (%).

*agricul*: population employed in agriculture (%).

*unemp*: unemployment rate (%).

*filliteracy*: female illiteracy rate (%).

*primary*: percentage of women over 6 years old who completed primary school.

#### *Model 3*

$$\Delta flfpr_{it} = \beta_{i0} - \beta_1 \log energy_{it} + \beta_2 (\log energy)_{it}^2 + \beta_3 \log gdpc_{it} - \beta_4 urpop_{it} - \beta_5 totfer_{it} \quad (6.3)$$

$$- \beta_6 industry_{it} - \beta_7 funemp_{it} + \beta_8 fmean_{it} + u_{it}$$

Different than first two models, education variable, unemployment variable and industry mix variable are not same in the third model. The education variable of the first model is the percentage of women over 6 years old who completed primary school; whereas female illiteracy rate is the one in the second one. Model 3 includes female mean years of schooling in labor force as an education variable. Tansel (2001) also used female mean years of schooling in labor force but the coefficient of this variable is not statistically significant. Furthermore, female unemployment rate and population in industry (%) is used. Kottis (1985) and Tansel (2001) also added female unemployment rate and industry mix into their models.<sup>37</sup> The sign of female unemployment rate is expected to be negative and the sign of the industry mix variable is expected to be negative. Explanations of 3 different variables used in model 3 are shown below.

- industry: population employed in industry (%).
- *funemp*: female unemployment rate (%).
- *fmean*: female mean years of schooling in labor force.

#### Model 4

$$\Delta flfpr_{it} = \beta_{i0} - \beta_1 \log gdp_{it} + \beta_2 (\log gdp)^2_{it} - \beta_3 urpop_{it} - \beta_4 totfer_{it} + \beta_5 agricul_{it} - \beta_6 munemp_{it} + \beta_7 primary_{it} + u_{it} \quad (6.4)$$

#### Model 5

$$\Delta flfpr_{it} = \beta_{i0} - \beta_1 \log gdp_{it} + \beta_2 (\log gdp)^2_{it} - \beta_3 urpop_{it} - \beta_4 totfer_{it} + \beta_5 agricul_{it} - \beta_6 munemp_{it} - \beta_7 filliteracy_{it} + u_{it} \quad (6.5)$$

#### Explanation of variables used in model 4 and model 5

*flfpr*: female labor force participation rate.

*log gdp*: natural logarithm of gross domestic product per capita.

$(\log gdp)^2$ : square of the natural logarithm of gross domestic product per capita.

*urpop*: urban population rate (%).

*totfer*: total fertility rate (%).

*agricul*: population employed in agriculture (%).

*munemp*: male unemployment rate (%).

*filliteracy*: female illiteracy rate (%).

*primary*: percentage of women over 6 years old who completed primary school.

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<sup>37</sup> He used industry mix variable in his models, but it was not statistically significant, and he excluded this variable from his models.

Model 4 and model 5 are shown above. Apart from first two models, gross domestic product per capita and its square are used as the measurement of economic development. These sign of these variables are expected to be negative and positive respectively. Adler *et al.* (1991) tried to reveal the interaction between culture, gender and labor force participation in their study. They have designed their study to examine the effects of economic development on women's share of the labor force. As most economists did before, they also used gross national product per capita as a measurement of economic development. Even though first three models include different explanatory variables than model 4 and model 5, it is still possible to compare, separately, the signs and impacts of economic development variables. Total fertility rate and urban population rate are the common variables again in these two models. Unlike previous model, another kind of unemployment is used in model 4 and in model 5, which is male unemployment rate. Kottis (1985) employed two alternative patterns of unemployment; these are female unemployment rate and male unemployment.

Furthermore, model 4 and model 5 include same explanatory variables, such as development variables, urban population rate, total fertility rate, male unemployment variable and agriculture variable, and because of having different education variables we can make suggestions about the effects of different education patterns. Percentage of women over 6 years old who completed primary school is the education variable in model 4, female illiteracy rate is the one in model 5.

## **7. Empirical Results**

This section of the paper is devoted to show and interpret the estimation results of the study. As already mentioned in previous sections, five different models are employed with the aim of estimating the effects of economic development and other variables on female labor force participation rates. Fixed effects model estimation is the estimation instrument for all models. The choice between random effects model and fixed effects model is explained in the methodology section. Hausman test is employed and concluded that all models rejected using of random effects model, and results of Hausman test is given in Appendix 1. Regression results of all models are presented in Table 1. Considering the estimation results in table 1., we can see not only the effects of economic development on female labor force participation, but also the effects of unemployment, education, fertility rate, urbanization rate can be seen. Signs of all explanatory variables in the models found to be consistent with expected outcomes which are outlined in section 6. Most of the models are statistically significant at 1 percent level, and have high  $R^2$ , i.e.

model 2 explains 97 percent of the model, and other models explain more than 99 percent of the models.

In all models, the signs of the indicators of economic development are found to be as expected. But in model 4 and in model 5, where gross domestic product per capita is used as a measurement of economic development, economic development has more significant effects than first three models. The coefficient of (logged) gross domestic product per capita is relatively high by having minus sign, and the coefficient of its square is positive. The coefficients of (logged) energy use are between -5 and -6, and square of them are around 0.5 levels in first three models. On the other hand, coefficient of (logged) gross domestic product per capita is -160.904 in model 4, and -194.158 in model 5; quadratic terms are 5.823 and 7.056 respectively. Hence, we can interpret that U-shaped hypothesis seems more obvious in model 4 and model 5 than in others. As a result, it can be thought of the existence of U-shaped hypothesis in Turkey between the years 1980-2000. Goldin (1995) proposed that female labor force participation rates first declines and then rises as the country develops. Since Turkey is not fully industrialized and not thoroughly considered as a developed country<sup>38</sup>, it is at the early stages of economic development and it is plausible to say that economic development decreases the female labor force participation rates in Turkey. Schultz (1990) argued that women's activities were changing rapidly in developed countries as the income rises. Taking into account theoretical approaches, female labor force participation rates is expected to rise in near future in Turkey. Tansel (2001) also proposed that there are reasonable time-series evidences that show the sharp decline in female labor force participation rates in Turkey. As we have already explained in section 2, U-shaped female participation curve hypotheses that agricultural sector is the dominant sector for female and male employment in developing countries and women are economically active due to large number of employment in agricultural sector, and female labor force participation rates are high. During the process of development, especially, at the early stages of economic development, home-based production pattern changes to market oriented production pattern. In a developing country, like Turkey, a decrease in female labor force participation rates can be due to experiencing early stages of economic development, rate of urbanization and increase in non-agricultural production. May be that is why Turkey is still on the downward portion of the U-shaped.

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<sup>38</sup> Turkey is considered as a developing country in Human Development Report 2007/2008. For instance, see, page 376. in the report.

**Table 1. Estimation Results**

		<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
<b>Explanatory Variables</b>	<b>log energy</b>	-6.811 <sup>(0.01)</sup>	-5.249 <sup>(0.01)</sup>	-6.257 <sup>(0.01)</sup>	-	-
	<b>(log energy)<sup>2</sup></b>	0.657 <sup>(0.01)</sup>	0.460 <sup>(0.01)</sup>	0.580 <sup>(0.01)</sup>	-	-
	<b>log gdpc</b>	2.374 <sup>(0.01)</sup>	3.136 <sup>(0.01)</sup>	1.708 <sup>(0.05)</sup>	-160.904 <sup>(0.01)</sup>	-194.158 <sup>(0.01)</sup>
	<b>(log gdpc)<sup>2</sup></b>	-	-	-	5.823 <sup>(0.01)</sup>	7.056 <sup>(0.01)</sup>
	<b>urpop</b>	-0.365 <sup>(0.01)</sup>	-0.434 <sup>(0.01)</sup>	-0.702 <sup>(0.01)</sup>	-0.395 <sup>(0.01)</sup>	-0.408 <sup>(0.01)</sup>
	<b>totfer</b>	-0.792 <sup>(0.01)</sup>	-1.582 <sup>(0.01)</sup>	-2.255 <sup>(0.01)</sup>	-0.885 <sup>(0.01)</sup>	-1.370 <sup>(0.01)</sup>
	<b>industry</b>	-	-	-0.177 <sup>(0.01)</sup>	-	-
	<b>agricul</b>	0.444 <sup>(0.01)</sup>	0.37 <sup>(0.01)</sup>	-	0.468 <sup>(0.01)</sup>	0.480 <sup>(0.01)</sup>
	<b>unemp</b>	-0.589 <sup>(0.01)</sup>	-0.659 <sup>(0.01)</sup>	-	-	-
	<b>funemp</b>	-	-	-0.649 <sup>(0.01)</sup>	-	-
	<b>munemp</b>	-	-	-	-0.377 <sup>(0.01)</sup>	-0.342 <sup>(0.01)</sup>
	<b>filliteracy</b>	-	-0.106 <sup>(0.01)</sup>	-	-	-0.092 <sup>(0.01)</sup>
	<b>primary</b>	0.210 <sup>(0.01)</sup>	-	-	0.264 <sup>(0.01)</sup>	-
	<b>fmean</b>	-	-	1.885 <sup>(0.01)</sup>	-	-
<b>R<sup>2</sup></b>	0.991	0.978	0.995	0.990	0.995	
<b>Adj. R<sup>2</sup></b>	0.986	0.965	0.993	0.984	0.993	
<b>F Statistic</b>	194.42	76.21	409.78	175.78	399.21	

Notes: All regressions are run by using E-view 5.1 software.

<sup>(0.01)</sup> significant at 1% level, <sup>(0.05)</sup> significant at 5% level. All of the explanatory variables in all models represent provincial values.

Definition of the variables: *log energy* – natural logarithm of industrial electricity consumption of per capita; *(log energy)<sup>2</sup>* – square of the natural logarithm of industrial electricity consumption of per capita; *log gdpc* – natural logarithm of gross domestic product (of the provinces) per capita; *(log gdpc)<sup>2</sup>* – square of the natural logarithm of gross domestic product(of the provinces) per capita; *urpop* – urban population rate (%); *totfer* – total fertility rate (%); *industry* – population employed in industry (%); *agricul* – population employed in agriculture (%); *unemp* – unemployment rate (%); *funemp* – female unemployment rate (%); *munemp* – male unemployment rate (%); *filliteracy* – female illiteracy rate (%); *primary* - percentage of women over 6 years old who completed primary school; *fmean*: female mean years of schooling in labor force.

Education is another important determinant of female labor force participation; therefore, education variables are used explanatory variables in the models. In order to measure and compare the effects of educational attainment, three different variables are used. These are female illiteracy rate, percentage of women over 6 years old who completed primary school and female mean years of schooling in labor force. The importance of education for female labor force participation has been posited in numerous studies.<sup>39</sup> Lincove (2008) claims that literacy is a prerequisite for the upward slope of the U-shaped curve. As mentioned above, Turkey is still on the downward portion of the U-shaped; hence, educational attainment has vital importance in order to increase the female labor force participation. The importance of educational attainment can be seen easily in Table 1. Let's compare first two models; model 1 and model 2. Each model has same explanatory variables except educational variables. Model 1 employs percentage of women over 6 years old who completed primary school as an educational variable, on the other hand, model 2 employs female illiteracy rate as an educational variable. Table 1. proves that female illiteracy rate hinders female labor force participation rates, whereas, other variable has positive effect on female labor force participation. Numerous studies also suggested that educational attainment increases female labor force participation rates.<sup>40</sup>

On the contrary, Lam and Duryea (1999) proposed that there is a negative relationship between primary schooling and female labor force participation, and positive relationship between secondary schooling and female labor force participation. Model 3, model 4 and model 5 reveal the positive effects of education on female labor force participation. Female mean years of schooling in labor force, which is used an educational variable in model 3, indicates that as the female mean years of schooling in labor force increases female labor force rates will also increase. Tansel (2001) also used female mean years of schooling in labor force but the coefficient of this variable is not statistically significant. Kottis (1990) suggested that female illiteracy has positive effect on female labor force participation. He also suggested that education could have both negative effect and positive effect in a transition economy. In their study named as *Time Series Growth in the Female Labor Force in USA*, Smith and Ward (1985) suggested the same results as Kottis (1990) found in Greece. They reported that there were strong positive relationship between the number of uneducated women and female labor force participation in 1900. For the case of Turkey, education patterns are somewhat different than Greece. Both time series evidences in section 3 and fixed effects models presented in Table 1. outline the positive

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<sup>39</sup> For instance, see, Goldin, Lincove, Psacharopoulos and Tzannatos (1989), Kottis, Tansel

<sup>40</sup> For instance, see, Tansel (1996), Psacharopoulos and Tzannatos (1989), Goldin (1995).

effects of education. Moreover, it should not be missed out that all of the education variables are statistically significant at 1 percent level.

Unemployment is conspired as another important determinant of female labor force participation. First two models employ general unemployment rate, model 3 employs female unemployment rate and male unemployment rate is used in last two models. The signs of the coefficients in all models are found to be as expected. Female unemployment rate has, roughly, more impact than others. Tansel (2001) also found that the coefficient of female unemployment rate was larger than male unemployment rate. Within the framework of “discouraged-worker effect” and “added-worker effect” hypothesis, the effects of female and male unemployment on female labor force participation are expected to be vague. Theoretically, when the unemployment rates are relatively high, it will be more difficult for females to enter labor market, and probability of not being employed increases. This can be a reasonable reason to be a discouraged worker. Added-worker hypothesis indicates that when males lose their job because of a high level of unemployment, Wives might enter the labor force in order to increase the income of the family. This hypothesis suggests a positive impact on female labor force participation (Tansel, 2001). On the other hand, Kottis (1990) claims that “added-worker” effect is dominated by “discouraged-worker” effect because of the inaccessibility and unavailability of the jobs for females, especially this is the case for less-developed and developing countries.

Urban population rate is one of the common variables in the models. Urban population rate refers to the population who live in urban areas. It is statistically significant at 1 percent level, and its coefficients are found to be as expected, and it has negative impact on female labor force participation rates. In contrast to Kottis (1990), we found that urbanization rate hinders female labor force participation rates. He suggested that availability and accessibility of jobs are relatively high in urban areas for females. But this does not comply with the findings that we have found in this study. Tansel (2001) also estimated the coefficient of urbanization rate as negative.

Total fertility rate is the other fixed variable used in all models. It is also statistically significant at 1 percent level and its coefficients are found to be negative. Total fertility rate has more impact on female labor force participation rates than urban population rate. The impact of fertility on female labor force participation is extensively studied. According to Semyonov (1980) when fertility rate is high, females devote themselves as a responsible for household activities. This is a reason to be in labor force less. Jaumotte (2003) claims

cross-country evidence does not support the argument of fertility and labor force interaction. He has given two good examples regarding this interaction. Nordic countries are experiencing high level of female labor force participation rates. But at the same time, they are characterized by a having high fertility rates; whereas, Southern European countries are not experiencing high level of female labor force participation even if the existence of low fertility. The case of Turkey is again different than Nordic and Southern European countries in account of total fertility rates. It is reasonable to expect the sign of total fertility rate as negative in Turkey. As Haghighat (2005) stressed the higher total fertility rate, the more patriarchal the family structure exists in the society. Turkey is an Islamic country and has patriarchal family structure, especially in some areas. Even though total fertility rate has been decreasing in the last 2 decades, Islamic belief and patriarchal family structure still impede female entering the labor market.

Population employed in agriculture and population employed in industry are other determinants of female labor force participation which were expected have positive and negative coefficient respectively. As expected agriculture have positive effects on female labor force participation. Since Turkey has not been fully industrialized, agriculture plays important role in Turkish economy. Only in some regions of Turkey, industry has greater importance than agriculture. Hoşgör and Smits (2006) agree that agriculture performs crucial role for the employment of females in Turkey. According to their study, half of employed women is working in agricultural work and roughly, 18 percent of Turkish women are employed in an agricultural job. All models except model 3 employs agricultural share. Table 1. shows that all coefficients are statistically significant and lies between 0.3 and 0.5. Kottis (1990) and Tansel (2001) also suggested that agriculture has positive effects on female labor force participation, that is, as the agricultural activities increases female labor force participation rates will also increase. Industry variable is used only in model 3 and statistically significant at 1 percent level. Unlike agriculture, the effects of industry share are found to be negative. This result is again in accordance with the result of Tansel (2001). As the countries industrialized and as the income increases, female labor force participation rates decrease due to the expansion of the market of introduction of new technologies (Goldin, 1995). Boserup (1970) stated that industrialization hinders the probability of women entering the labor market, especially, in the early industrialization phase, women employment was greatly reduced. In contrast to previous studies, Lincove (2008) suggested that the effect of industrialization on female labor force participation is not obviously negative. He could not find any statistically significant negative effect of industrial employment on female labor force participation in any of his longitudinal models.

## 8. Conclusion

In this paper an attempt is made to explain the relationship between economic development and female labor force participation in Turkey, essentially, the effect of economic development on female labor force participation underpins this study within the framework of U-shaped hypothesis. In addition to the effects of economic development, other determinants of female labor force participation, such as education, unemployment, urbanization rate, total fertility rate and industry mix are also analyzed in five different econometric models. Two different kinds of development indicators are used in this study, first three models employ industrial electricity consumption of per capita, model 4 and model 5 employs gross domestic product as indicators of economic development. In all models, linear and quadratic forms of these economic development variables are included. The sign of these coefficients are negative and positive respectively; these results affirm the U-shaped hypothesis. It must be noted that U-shaped hypothesis seems more obvious in model 4 and model 5 than in others.

Other determinants of female labor force participation are found to be statistically significant and their coefficients are also found as expected. Educational attainment is one of the most important factors that has great impact on female labor force participation. Hence, three different education variables are used in order to measure and compare the effects of educational attainment. These are female illiteracy rate, percentage of women over 6 years old who completed primary school and female mean years of schooling in labor force. In all models, the effect of education found to be positive, model 2 and model 5 suggest that female illiteracy rate hinders female labor force participation. On the other hand, it is found that having primary education background and female mean years of schooling in labor force have positive effects on female labor force participation. Turkey is still on the downward portion of the U-shaped; hence, educational attainment has vital importance in order to increase the female labor force participation.

It is studied and concluded that unemployment is one of the other determinants of female labor force participation. In this study three types of unemployment are used, general unemployment rate, female unemployment rate and male unemployment rate. According to econometric results, all unemployment variables have negative effects on female labor force participation, but female unemployment rate has, roughly, more impact than others. These results are in accordance with “discouraged-worker effect” hypothesis, theoretically, when the unemployment rates are relatively high, it will be more difficult for females to enter labor market, and probability of not being employed increases. The effects of urbanization rate and total fertility rate are found to be

as expected in all models; both variables have hinder female labor force participation. It should not be missed out that total fertility rate has more impact on female labor force participation rates than urban population rate; that is, when fertility rate is high, females devote themselves as a responsible for household activities. Population employed in agriculture and population employed in industry are other determinants of female labor force participation and they have positive and negative coefficient respectively.

Exhibiting times series evidences is another approach in this paper to analyze the trends of female labor force participation rates and female labor force participation differences according by different reasons. Time series evidence shows that there is a considerable slowdown in the decline of female labor force participation rates. Both econometric models and time series evidences suggest that Turkey is still experiencing the downward portion of U-shaped, may be, due to being at the early stages of economic development. Hence, Turkey is expected to lie on the upward portion of U-shaped in the following decades.

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## Appendix 1

### Hausman Test Results

To make a choice between fixed effects and random effects model Hausman Test is employed. According to E-views output, the very low p-value indicates that fixed effects model is the appropriate model for panel data estimation. If p-value is very low we reject the null hypothesis that random effects estimator is correct, and accept that fixed effects estimator is correct.

$H_0$ : Random effects estimator is correct.

$H_a$ : Fixed effects estimator is correct.

#### Model 1

Correlated Random Effects - Hausman Test  
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	44.934208	8	0.0000

Reject the null hypothesis; hence, fixed effects estimator is correct.

#### Model 2

Correlated Random Effects - Hausman Test  
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	31.258197	8	0.0001

Reject the null hypothesis; hence, fixed effects estimator is correct.

#### Model 3

Correlated Random Effects - Hausman Test  
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	19.556629	8	0.0122

Reject the null hypothesis; hence, fixed effects estimator is correct.

#### Model 4

Correlated Random Effects - Hausman Test

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	39.808443	7	0.0000

Reject the null hypothesis; hence, fixed effects estimator is correct.

#### Model 5

Correlated Random Effects - Hausman Test

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	21.415024	7	0.0032

Reject the null hypothesis; hence, fixed effects estimator is correct.

### Estimation Output

#### Model 1

Dependent Variable: FLFPR?

Method: Pooled EGLS (Cross-section weights)

Sample: 1980 2000

Included observations: 3

Cross-sections included: 67

Total pool (balanced) observations: 201

Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	19.97020	11.27343	1.771439	0.0789
LNENERGY?	-6.811479	1.275372	-5.340778	0.0000
LNENERGY?^2	0.657606	0.114853	5.725627	0.0000
LNGDPC?	2.374043	0.773017	3.071140	0.0026
URPOP?	-0.365454	0.046667	-7.831100	0.0000
TOTFER?	-0.792746	0.299846	-2.643840	0.0092
AGRICUL?	0.444843	0.035777	12.43377	0.0000
UNEMP?	-0.589493	0.114070	-5.167802	0.0000
PRIMARY?	0.210417	0.022123	9.511275	0.0000

Fixed Effects (Cross)

ADANA--C	1.892794
ADIYAMAN--C	3.227797
AFYON--C	-2.255832
AGRI--C	9.881526
AMASYA--C	-2.438582
ANKARA--C	8.814800
ANTALYA--C	0.881705
ARTVIN--C	-2.177509
AYDIN--C	-2.069066
BALIKESIR--C	-6.737120
BILECIK--C	-9.310285
BINGOL--C	0.029820
BITLIS--C	1.907142
BOLU--C	-0.320140
BURDUR--C	-3.451225
BURSA--C	-0.656306
CANAKKALE--C	-4.720351
CANKIRI--C	-1.892095
CORUM--C	-2.832797
DENIZLI--C	-0.076487
DIYARBAKIR--C	4.753340
EDIRNE--C	0.198168
ELAZIG--C	-2.749175
ERZINCAN--C	-1.265495
ERZURUM--C	2.118978
ESKISEHIR--C	-3.231982
GAZIANTEP--C	-0.432925
GIRESUN--C	2.636622
GUMUSHANE--C	-0.881273
HAKKARI--C	8.897622
HATAY--C	-2.760651
ISPARTA--C	0.309750
MERSIN--C	-1.612673
ISTANBUL--C	6.397968
IZMIR--C	1.037203
KARS--C	7.353292
KASTAMONU--C	0.656798
KAYSERI--C	-2.281176
KIRKLARELI--C	-0.719586
KIRSEHIR--C	-5.117267
KOCAELI--C	-8.401338
KONYA--C	-6.554852
KUTAHYA--C	-4.336225
MALATYA--C	-1.716448
MANISA--C	-1.626195
KMARAS--C	-1.068186
MARDIN--C	6.024682
MUGLA--C	-1.783864
MUS--C	6.653745
NEVSEHIR--C	-3.717529
NIGDE--C	-1.687388

ORDU--C	3.940781
RIZE--C	2.118937
SAKARYA--C	-3.418183
SAMSUN--C	2.226141
SIIRT--C	6.633667
SINOP--C	1.446081
SIVAS--C	-0.487087
TEKIRDAG--C	0.371182
TOKAT--C	-0.912367
TRABZON--C	3.383615
TUNCELI--C	2.731828
SURFA--C	2.060076
USAK--C	-1.676796
VAN--C	7.751855
YOZGAT--C	-1.474630
ZONGULDAK--C	-7.486828

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Effects Specification

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Cross-section fixed (dummy variables)

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Weighted Statistics

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R-squared	0.991318	Mean dependent var	115.0032
Adjusted R-squared	0.986219	S.D. dependent var	156.3894
S.E. of regression	3.059838	Sum squared resid	1179.689
F-statistic	194.4204	Durbin-Watson stat	2.394054
Prob(F-statistic)	0.000000		

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Unweighted Statistics

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R-squared	0.990617	Mean dependent var	49.75682
Sum squared resid	1274.942	Durbin-Watson stat	2.023427

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## Model 2

Dependent Variable: FLFPR?

Method: Pooled EGLS (Cross-section weights)

Sample: 1980 2000

Included observations: 3

Cross-sections included: 67

Total pool (balanced) observations: 201

Linear estimation after one-step weighting matrix

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	29.11071	17.10305	1.702077	0.0912
LNENERGY?	-5.249486	1.617658	-3.245115	0.0015
LNENERGY?^2	0.460799	0.150550	3.060777	0.0027

LNGDPC?	3.136765	1.035957	3.027892	0.0030
URPOP?	-0.434125	0.064883	-6.690840	0.0000
TOTFER?	-1.582366	0.388437	-4.073679	0.0001
AGRICUL?	0.377059	0.053817	7.006328	0.0000
UNEMP?	-0.659452	0.172899	-3.814081	0.0002
FILLITERACY?	-0.106069	0.037573	-2.823031	0.0055
Fixed Effects (Cross)				
ADANA--C	2.183509			
ADIYAMAN--C	4.318271			
AFYON--C	-1.762223			
AGRI--C	10.72203			
AMASYA--C	-2.364080			
ANKARA--C	5.867082			
ANTALYA--C	-0.148643			
ARTVIN--C	-2.746594			
AYDIN--C	-3.108431			
BALIKESIR--C	-6.733196			
BILECIK--C	-7.062799			
BINGOL--C	1.536938			
BITLIS--C	4.104544			
BOLU--C	-1.248899			
BURDUR--C	-3.786452			
BURSA--C	-0.093572			
CANAKKALE--C	-5.151032			
CANKIRI--C	-1.636073			
CORUM--C	-2.266402			
DENIZLI--C	-0.925490			
DIYARBAKIR--C	4.709373			
EDIRNE--C	-0.315297			
ELAZIG--C	-2.413456			
ERZINCAN--C	-2.151477			
ERZURUM--C	2.414965			
ESKISEHIR--C	-3.345671			
GAZIANTEP--C	0.408571			
GIRESUN--C	2.326901			
GUMUSHANE--C	-0.708589			
HAKKARI--C	10.88730			
HATAY--C	-2.392621			
ISPARTA--C	0.125698			
MERSIN--C	-1.741087			
ISTANBUL--C	3.502916			
IZMIR--C	0.248487			
KARS--C	7.006222			
KASTAMONU--C	0.622791			
KAYSERI--C	-2.217698			
KIRKLARELI--C	-0.908117			
KIRSEHIR--C	-5.077691			
KOCAELI--C	-8.424526			
KONYA--C	-4.521304			
KUTAHYA--C	-3.540300			
MALATYA--C	-2.365185			

MANISA--C	-1.538385
KMARAS--C	-0.493616
MARDIN--C	7.193831
MUGLA--C	-3.178713
MUS--C	6.828471
NEVSEHIR--C	-4.358595
NIGDE--C	-2.088056
ORDU--C	3.511467
RIZE--C	1.182834
SAKARYA--C	-3.715477
SAMSUN--C	1.734100
SIIRT--C	7.933525
SINOP--C	1.396280
SIVAS--C	-0.558765
TEKIRDAG--C	0.698095
TOKAT--C	-0.488458
TRABZON--C	1.284040
TUNCELI--C	1.376854
SURFA--C	2.580110
USAK--C	-1.369031
VAN--C	8.484673
YOZGAT--C	-0.979197
ZONGULDAK--C	-7.264684

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Effects Specification

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Cross-section fixed (dummy variables)

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Weighted Statistics

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R-squared	0.978148	Mean dependent var	82.59954
Adjusted R-squared	0.965314	S.D. dependent var	56.54653
S.E. of regression	3.090013	Sum squared resid	1203.071
F-statistic	76.21636	Durbin-Watson stat	2.696572
Prob(F-statistic)	0.000000		

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Unweighted Statistics

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R-squared	0.974868	Mean dependent var	49.75682
Sum squared resid	1383.625	Durbin-Watson stat	2.221607

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### Model 3

Dependent Variable: FLFPR?

Method: Pooled EGLS (Cross-section weights)

Sample: 1980 2000

Included observations: 3

Cross-sections included: 67

Total pool (balanced) observations: 201

Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	78.88878	11.21023	7.037215	0.0000
LNENERGY?	-6.257465	1.679086	-3.726710	0.0003
LNENERGY?^2	0.580525	0.155700	3.728499	0.0003
LNGDPC?	1.708096	0.827029	2.065341	0.0409
URPOP?	-0.702710	0.029282	-23.99818	0.0000
TOTFER?	-2.255387	0.312129	-7.225811	0.0000
INDUSTRY?	-0.177078	0.055331	-3.200358	0.0017
FUNEMP?	-0.649374	0.118414	-5.483935	0.0000
FMEAN?	1.885726	0.435913	4.325920	0.0000
Fixed Effects (Cross)				
ADANA--C	2.468689			
ADIYAMAN--C	8.352673			
AFYON--C	-0.585706			
AGRI--C	11.27703			
AMASYA--C	-0.697150			
ANKARA--C	-2.369275			
ANTALYA--C	-1.969344			
ARTVIN--C	-4.409233			
AYDIN--C	-2.778348			
BALIKESIR--C	-6.888192			
BILECIK--C	-7.404098			
BINGOL--C	1.850193			
BITLIS--C	6.090478			
BOLU--C	-1.851127			
BURDUR--C	-3.444639			
BURSA--C	-0.654928			
CANAKKALE--C	-6.847028			
CANKIRI--C	-0.155756			
CORUM--C	1.033369			
DENIZLI--C	-2.354074			
DIYARBAKIR--C	6.501456			
EDIRNE--C	-1.413071			
ELAZIG--C	-2.261080			
ERZINCAN--C	-3.022347			
ERZURUM--C	3.767041			
ESKISEHIR--C	-3.936423			
GAZIANTEP--C	2.384302			
GIRESUN--C	4.050573			
GUMUSHANE--C	-0.686711			
HAKKARI--C	9.956390			
HATAY--C	-3.696700			
ISPARTA--C	-1.419362			
MERSIN--C	-2.289636			
ISTANBUL--C	-8.266646			
IZMIR--C	-4.202330			
KARS--C	7.599804			
KASTAMONU--C	3.131649			
KAYSERI--C	-4.030932			

KIRKLARELI--C	-3.035926
KIRSEHIR--C	-3.737612
KOCAELI--C	-14.31629
KONYA--C	-3.072793
KUTAHYA--C	-2.307033
MALATYA--C	-1.239660
MANISA--C	1.863229
KMARAS--C	1.850247
MARDIN--C	8.797634
MUGLA--C	-7.508254
MUS--C	8.956549
NEVSEHIR--C	-3.221044
NIGDE--C	-1.015708
ORDU--C	5.363118
RIZE--C	1.318938
SAKARYA--C	-4.119353
SAMSUN--C	4.054211
SIIRT--C	9.329200
SINOP--C	3.243117
SIVAS--C	1.412874
TEKIRDAG--C	-1.756552
TOKAT--C	3.101882
TRABZON--C	0.050834
TUNCELI--C	-0.967961
SURFA--C	5.693134
USAK--C	0.290624
VAN--C	9.846182
YOZGAT--C	1.468567
ZONGULDAK--C	-11.17167

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Effects Specification

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Cross-section fixed (dummy variables)

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Weighted Statistics

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R-squared	0.995862	Mean dependent var	113.2823
Adjusted R-squared	0.993432	S.D. dependent var	122.7211
S.E. of regression	3.462601	Sum squared resid	1510.691
F-statistic	409.7844	Durbin-Watson stat	2.828156
Prob(F-statistic)	0.000000		

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Unweighted Statistics

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R-squared	0.995202	Mean dependent var	49.75682
Sum squared resid	1751.822	Durbin-Watson stat	2.216335

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Model 4

Dependent Variable: FLFPR?

Method: Pooled EGLS (Cross-section weights)

Sample: 1980 2000

Included observations: 3

Cross-sections included: 67

Total pool (balanced) observations: 201

Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1143.660	129.5700	8.826582	0.0000
LNGDPC?	-160.9044	18.59697	-8.652182	0.0000
LNGDPC? <sup>2</sup>	5.823620	0.671859	8.667923	0.0000
URPOP?	-0.395114	0.041826	-9.446614	0.0000
TOTFER?	-0.885751	0.307445	-2.881006	0.0047
AGRICUL?	0.468025	0.044230	10.58169	0.0000
MUNEMP?	-0.377246	0.088740	-4.251133	0.0000
PRIMARY?	0.264836	0.029828	8.878876	0.0000
Fixed Effects (Cross)				
ADANA--C	3.099674			
ADIYAMAN--C	2.958252			
AFYON--C	-2.498318			
AGRI--C	3.872881			
AMASYA--C	-2.394107			
ANKARA--C	8.870042			
ANTALYA--C	1.049155			
ARTVIN--C	-2.102854			
AYDIN--C	-2.307111			
BALIKESIR--C	-5.901598			
BILECIK--C	-6.313908			
BINGOL--C	0.817404			
BITLIS--C	1.929980			
BOLU--C	-1.682944			
BURDUR--C	-3.262851			
BURSA--C	1.024326			
CANAKKALE--C	-4.427409			
CANKIRI--C	-1.651615			
CORUM--C	-3.044372			
DENIZLI--C	0.427038			
DIYARBAKIR--C	5.556853			
EDIRNE--C	1.043054			
ELAZIG--C	-0.384255			
ERZINCAN--C	-1.665090			
ERZURUM--C	0.492674			
ESKISEHIR--C	-2.697296			
GAZIANTEP--C	1.705172			
GIRESUN--C	2.111057			
GUMUSHANE--C	-1.048861			
HAKKARI--C	7.385603			

HATAY--C	0.198671
ISPARTA--C	0.912981
MERSIN--C	-1.378842
ISTANBUL--C	6.149215
IZMIR--C	1.846219
KARS--C	3.074297
KASTAMONU--C	0.887806
KAYSERI--C	-0.954213
KIRKLARELI--C	-1.013356
KIRSEHIR--C	-4.980125
KOCAELI--C	-10.37910
KONYA--C	-4.909576
KUTAHYA--C	-3.182193
MALATYA--C	-1.548365
MANISA--C	-2.500125
KMARAS--C	0.292817
MARDIN--C	5.113724
MUGLA--C	-3.126840
MUS--C	2.699946
NEVSEHIR--C	-3.693812
NIGDE--C	-1.262024
ORDU--C	2.747914
RIZE--C	2.766322
SAKARYA--C	-3.286203
SAMSUN--C	2.580610
SIIRT--C	6.965371
SINOP--C	1.048233
SIVAS--C	-1.472238
TEKIRDAG--C	2.053663
TOKAT--C	-1.704230
TRABZON--C	3.559273
TUNCELI--C	2.295436
SURFA--C	1.500657
USAK--C	-0.633697
VAN--C	5.610924
YOZGAT--C	-3.359668
ZONGULDAK--C	-3.880046

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Effects Specification

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Cross-section fixed (dummy variables)

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Weighted Statistics

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R-squared	0.990200	Mean dependent var	94.14654
Adjusted R-squared	0.984567	S.D. dependent var	76.77072
S.E. of regression	2.761126	Sum squared resid	968.2245
F-statistic	175.7805	Durbin-Watson stat	2.516826
Prob(F-statistic)	0.000000		

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Unweighted Statistics

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R-squared	0.989436	Mean dependent var	49.75682
Sum squared resid	1043.713	Durbin-Watson stat	2.163916

## Model 5

Dependent Variable: FLFPR?

Method: Pooled EGLS (Cross-section weights)

Sample: 1980 2000

Included observations: 3

Cross-sections included: 67

Total pool (balanced) observations: 201

Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1381.741	85.51118	16.15860	0.0000
LNGDPC?	-194.1586	12.58653	-15.42591	0.0000
LNGDPC? <sup>2</sup>	7.056136	0.468297	15.06764	0.0000
URPOP?	-0.408606	0.051724	-7.899670	0.0000
TOTFER?	-1.370265	0.212680	-6.442856	0.0000
AGRICUL?	0.480141	0.047165	10.18012	0.0000
MUNEMP?	-0.342006	0.077992	-4.385164	0.0000
FILLITERACY?	-0.092216	0.018831	-4.897110	0.0000
Fixed Effects (Cross)				
ADANA--C	2.456138			
ADIYAMAN--C	1.837726			
AFYON--C	-1.044643			
AGRI--C	1.454365			
AMASYA--C	-1.224031			
ANKARA--C	7.814109			
ANTALYA--C	1.317767			
ARTVIN--C	-1.660684			
AYDIN--C	-1.866883			
BALIKESIR--C	-4.759329			
BILECIK--C	-4.903463			
BINGOL--C	-0.630351			
BITLIS--C	0.239331			
BOLU--C	-1.530786			
BURDUR--C	-1.659246			
BURSA--C	1.812925			
CANAKKALE--C	-3.425853			
CANKIRI--C	-0.125622			
CORUM--C	-2.093189			
DENIZLI--C	1.116474			
DIYARBAKIR--C	3.089949			
EDIRNE--C	1.877264			
ELAZIG--C	-1.422068			
ERZINCAN--C	-1.064901			
ERZURUM--C	0.558710			

ESKISEHIR--C	-1.511294
GAZIANTEP--C	1.622962
GIRESUN--C	1.306748
GUMUSHANE--C	-0.345153
HAKKARI--C	4.922174
HATAY--C	-0.299377
ISPARTA--C	2.436615
MERSIN--C	-1.986185
ISTANBUL--C	5.680429
IZMIR--C	1.188296
KARS--C	2.247012
KASTAMONU--C	1.491213
KAYSERI--C	-0.031004
KIRKLARELI--C	-0.402185
KIRSEHIR--C	-4.159516
KOCAELI--C	-12.36434
KONYA--C	-2.686945
KUTAHYA--C	-1.339703
MALATYA--C	-2.127253
MANISA--C	-1.785478
KMARAS--C	-0.090292
MARDIN--C	3.137187
MUGLA--C	-2.613415
MUS--C	0.306347
NEVSEHIR--C	-2.908779
NIGDE--C	-1.077125
ORDU--C	2.288823
RIZE--C	2.639227
SAKARYA--C	-1.833974
SAMSUN--C	2.586358
SIIRT--C	5.333771
SINOP--C	2.060186
SIVAS--C	-1.585748
TEKIRDAG--C	3.046918
TOKAT--C	-0.910323
TRABZON--C	2.746454
TUNCELI--C	1.410157
SURFA--C	-0.598316
USAK--C	0.468572
VAN--C	3.846304
YOZGAT--C	-2.683076
ZONGULDAK--C	-3.589981

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Effects Specification

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Cross-section fixed (dummy variables)

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Weighted Statistics

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R-squared	0.995661	Mean dependent var	101.2782
Adjusted R-squared	0.993167	S.D. dependent var	157.0939

S.E. of regression	2.873326	Sum squared resid	1048.512
F-statistic	399.2101	Durbin-Watson stat	2.967221
Prob(F-statistic)	0.000000		

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Unweighted Statistics

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R-squared	0.995201	Mean dependent var	49.75682
Sum squared resid	1159.658	Durbin-Watson stat	2.552542

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## Appendix 2

### Tables

**Table 2. Labor Force Participation Rates by Gender, Turkey (%)**

	Male	Female
1955	95.4	72.0
1960	93.6	65.4
1965	91.8	56.6
1970	79.5	50.3
1975	80.9	47.3
1980	79.8	45.8
1985	78.3	43.6
1990	80.5	35.3
1995	78.3	31.0
2000	73.7	26.6
2005	72.2	24.8
2006	71.5	24.9
2007	71.6	24.4

Source: 1955-1990: Population Census Results, State Institute of Statistics  
1990-2007: Provincial indicators (1980-2002), State Institute of Statistics

**Table 3. Labor Force Participation Rates by Gender and Location (%)**

	Urban		Rural	
	Male	Female	Male	Female
1988	78.1	17.7	84.7	50.7
1989	76.3	18.2	85.1	54.0
1990	78.0	18.1	83.4	53.4
1991	77.3	14.9	82.3	56.1
1992	76.3	17.4	83.3	51.6
1993	75.4	16.8	81.0	40.7
1994	75.7	17.6	82.4	45.8
1995	74.5	17.1	83.3	49.3
1996	73.3	15.8	83.5	51.1
1997	74.2	17.6	81.3	41.0
1998	73.8	17.1	83.0	49.3
1999	71.1	17.5	80.0	42.1
2000	70.9	17.2	77.9	40.2
2001	70.6	17.4	76.4	41.7
2002	69.8	19.1	74.5	41.4
2003	68.9	18.5	72.9	39.0
2004	70.8	18.3	74.7	36.7
2005	71.5	19.3	73.5	33.7
2006	70.8	19.9	72.7	33.0
2007	71.1	19.9	72.7	32.0

Source: Provincial indicators (1980-2002), State Institute of Statistics

**Table 4. Female Labor Force Participation Rates by Educational Attainment, Turkey (%)**

	<b>Illiterate</b>	<b>Less than High School</b>	<b>High School</b>	<b>Higher Education</b>
<b>1988</b>	32.3	32.4	47.4	82.5
<b>1989</b>	33.5	34.6	44.4	81.0
<b>1990</b>	32.7	33.4	47.5	80.9
<b>1991</b>	33.2	32.1	39.3	78.4
<b>1992</b>	29.0	31.1	42.3	84.3
<b>1993</b>	23.6	24.9	40.2	81.7
<b>1994</b>	26.5	28.4	36.0	79.1
<b>1995</b>	27.6	29.4	36.5	73.0
<b>1996</b>	29.0	28.8	37.1	72.7
<b>1997</b>	21.4	25.5	39.3	73.6
<b>1998</b>	26.3	27.9	36.7	76.1
<b>1999</b>	25.6	24.8	32.2	68.9
<b>2000</b>	25.2	23.0	31.8	70.1
<b>2001</b>	24.8	24.2	31.1	70.8
<b>2002</b>	24.4	24.9	31.9	71.5
<b>2003</b>	23.6	23.4	28.9	69.5
<b>2004</b>	19.3	22.8	30.6	71.3
<b>2005</b>	17.5	21.8	30.9	70.0
<b>2006</b>	16.2	21.8	31.4	69.8
<b>2007</b>	15.3	20.9	31.2	69.6

Source: Provincial indicators (1980-2002), State Institute of Statistics

**Table 5. Female Labor Force Participation Rates by Educational Attainment and Location (%)**

	<b>Urban</b>				<b>Rural</b>			
	<b>Illiterate</b>	<b>Less than High School</b>	<b>High School</b>	<b>Higher Education</b>	<b>Illiterate</b>	<b>Less than High School</b>	<b>High School</b>	<b>Higher Education</b>
<b>1988</b>	8.5	13.9	45.7	80.3	47.1	52.7	53.4	89.8
<b>1989</b>	8.3	15.0	41.9	78.8	49.4	56.8	58.0	91.4
<b>1990</b>	6.8	14.3	44.3	79.3	49.9	55.2	59.2	89.4
<b>1991</b>	4.8	11.0	37.2	78.0	51.0	59.5	53.5	81.0
<b>1992</b>	7.1	12.4	40.9	83.8	44.0	56.0	51.9	88.7
<b>1993</b>	5.4	11.3	38.6	80.8	35.2	42.4	47.8	87.7
<b>1994</b>	6.5	12.5	33.7	78.2	39.3	48.5	49.5	86.2
<b>1995</b>	6.2	11.5	34.6	72.6	43.4	52.3	47.2	77.5
<b>1996</b>	6.0	9.7	33.8	73.2	46.3	53.1	52.6	68.6
<b>1997</b>	4.6	11.8	36.6	73.5	34.7	43.1	53.4	73.8
<b>1998</b>	4.9	9.8	34.0	76.6	44.0	51.4	50.8	70.4
<b>1999</b>	5.4	11.6	31.4	69.4	39.8	43.2	36.8	64.9
<b>2000</b>	5.1	10.6	30.6	69.6	38.2	40.8	38.9	75.5
<b>2001</b>	5.4	11.3	29.8	70.2	37.5	43.6	38.7	77.8
<b>2002</b>	5.8	12.6	31.1	70.6	37.8	42.8	36.0	78.8
<b>2003</b>	5.5	12.1	28.3	69.3	37.6	39.4	31.7	71.4
<b>2004</b>	5.7	12.2	29.7	71.1	31.0	38.5	34.6	72.3
<b>2005</b>	6.3	12.9	29.9	69.9	27.5	35.3	34.7	70.5
<b>2006</b>	5.6	13.4	30.6	69.8	25.6	35.0	34.7	69.8
<b>2007</b>	5.9	12.7	30.3	69.3	23.7	34.0	35.1	71.6

Source: Provincial indicators (1980-2002), State Institute of Statistics

**Table 6. Female Labor Force Participation Rates by Age Group, Turkey (%)**

	Age Group											
	0-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
<b>1988</b>		40.5	40.8	35.9	36.4	36.5	34.5	34.3	34.1	27.3	19.8	10.1
<b>1989</b>		41.3	41.8	37.2	39.3	39.8	38.6	36.1	34.2	31.3	25.0	10.9
<b>1990</b>		38.4	40.7	35.8	36.3	37.4	37.0	35.4	33.1	30.3	22.2	9.3
<b>1991</b>		40.0	40.9	34.4	35.8	35.7	36.1	36.0	35.4	34.3	20.7	8.5
<b>1992</b>		34.9	40.5	33.8	34.5	36.4	35.4	33.9	31.8	29.6	20.1	9.7
<b>1993</b>		28.9	33.5	29.6	28.6	30.0	28.8	27.3	24.3	20.7	15.9	6.5
<b>1994</b>		33.3	37.9	33.3	33.2	33.3	32.6	32.9	30.7	28.1	20.1	9.7
<b>1995</b>		31.9	35.9	33.8	32.8	33.4	34.4	30.6	29.6	27.4	21.4	10.8
<b>1996</b>		31.6	35.8	31.7	31.2	33.4	32.6	29.8	30.3	28.4	24.0	11.3
<b>1997</b>		27.9	35.8	30.8	29.6	30.4	30.2	29.3	26.9	27.3	21.6	10.8
<b>1998</b>		27.8	34.7	32.8	28.9	31.7	31.0	28.0	28.0	27.3	22.2	12.8
<b>1999</b>		28.5	37.8	32.3	33.0	33.8	32.7	27.1	26.9	27.3	27.6	16.6
<b>2000</b>		23.4	31.1	30.7	28.4	28.9	27.5	24.5	24.5	22.7	16.9	10.3
<b>2001</b>		21.9	32.4	30.0	29.9	29.5	28.1	25.7	24.3	21.8	18.5	11.6
<b>2002</b>		23.1	34.5	32.6	32.4	31.2	30.2	28.5	25.5	23.2	22.6	11.5
<b>2003</b>		20.9	32.3	32.1	31.0	31.1	29.5	27.1	23.7	23.1	19.4	10.5
<b>2004</b>		19.0	32.7	31.2	29.3	30.8	28.2	25.5	22.3	21.3	17.9	8.8
<b>2005</b>		18.0	31.9	31.4	29.0	30.3	28.7	25.8	21.9	18.4	15.3	7.6
<b>2006</b>		17.7	31.4	31.9	30.1	31.5	29.4	24.8	21.8	18.5	14.6	6.6

Source: Provincial indicators (1980-2002), State Institute of Statistics

**Table 7. Female Labor Force Participation Rates by Marital Status, Turkey (%)**

	Single	Married	Divorced	Widowed
<b>1988</b>	47.8	32.0	41.5	16.0
<b>1989</b>	48.5	34.2	48.0	16.5
<b>1990</b>	46.6	32.5	41.7	14.4
<b>1991</b>	47.4	32.2	43.5	14.1
<b>1992</b>	44.4	30.8	45.5	14.0
<b>1993</b>	37.5	24.6	42.5	10.8
<b>1994</b>	42.2	29.1	39.4	14.0
<b>1995</b>	40.8	28.7	43.6	14.4
<b>1996</b>	40.4	28.3	40.2	13.8
<b>1997</b>	38.3	26.3	44.3	13.4
<b>1998</b>	38.7	26.6	42.9	14.0
<b>1999</b>	39.5	28.4	46.6	15.8
<b>2000</b>	33.7	24.2	40.2	10.8
<b>2001</b>	33.5	24.6	43.2	12.1
<b>2002</b>	36.8	26.4	42.1	12.4
<b>2003</b>	35.0	25.3	41.2	11.5
<b>2004</b>	34.1	23.9	41.0	11.9
<b>2005</b>	34.0	23.0	43.7	10.6
<b>2006</b>	34.3	23.1	42.1	10.0

Source: Provincial indicators (1980-2002), State Institute of Statistics

**Table 8. Male Labor Force Participation Rates by Marital Status, Turkey (%)**

	Single	Married	Divorced	Widowed
<b>1988</b>	91.8	86.4	81.1	30.1
<b>1989</b>	69.8	86.1	76.3	34.4
<b>1990</b>	70.7	84.5	77.1	31.3
<b>1991</b>	71.2	85.3	78.5	33.3
<b>1992</b>	69.1	85.4	70.2	32.2
<b>1993</b>	65.8	84.5	76.4	31.9
<b>1994</b>	66.7	84.5	71.8	28.0
<b>1995</b>	64.4	84.6	83.5	33.8
<b>1996</b>	63.5	83.9	77.1	30.4
<b>1997</b>	62.2	83.5	75.5	32.8
<b>1998</b>	61.2	83.9	78.3	31.6
<b>1999</b>	61.9	82.9	76.8	33.4
<b>2000</b>	58.5	80.6	71.9	28.4
<b>2001</b>	56.6	79.5	71.9	30.2
<b>2002</b>	56.4	79.2	71.0	26.3
<b>2003</b>	54.9	78.2	69.6	24.5
<b>2004</b>	58.3	79.4	76.5	74.0
<b>2005</b>	58.7	79.0	70.5	24.4
<b>2006</b>	58.0	78.2	68.2	22.4

Source: Provincial indicators (1980-2002), State Institute of Statistics

**Table 9. Employment by Economic Activity and Gender, Turkey (%)**

	Male			Female		
	Agriculture	Industry	Service	Agriculture	Industry	Service
<b>1955</b>	70.68	10.95	18.37	96.14	2.32	1.54
<b>1960</b>	66.68	11.79	21.53	95.39	2.75	1.86
<b>1965</b>	64.29	13.02	22.69	95.83	1.56	2.60
<b>1970</b>	55.58	12.36	32.07	90.30	5.12	4.58
<b>1975</b>	56.40	12.06	31.54	89.31	4.25	6.44
<b>1980</b>	44.54	15.85	39.61	87.86	5.53	7.61
<b>1985</b>	43.44	15.50	41.06	86.70	4.48	8.82
<b>1988</b>	33.80	18.83	39.42	76.77	8.56	14.36
<b>1989</b>	33.96	19.06	39.21	76.45	9.41	13.93
<b>1990</b>	32.80	18.80	41.42	75.04	9.57	15.22
<b>1991</b>	33.53	18.44	40.44	78.39	7.17	14.28
<b>1992</b>	33.43	19.40	39.25	70.58	12.72	16.30
<b>1993</b>	31.40	18.13	41.81	66.95	12.19	20.45
<b>1994</b>	31.40	18.56	41.41	69.38	10.80	19.32
<b>1995</b>	33.14	18.47	39.89	71.20	9.20	19.21
<b>1996</b>	32.26	19.17	39.74	73.43	8.70	17.32
<b>1997</b>	30.45	21.08	39.84	65.06	12.63	21.77
<b>1998</b>	31.53	19.11	40.88	68.33	10.21	20.94
<b>1999</b>	27.18	20.56	43.13	62.27	13.27	24.05
<b>2000</b>	27.00	19.52	45.04	60.48	12.59	26.36
<b>2001</b>	27.70	19.74	45.55	63.33	11.78	24.54
<b>2002</b>	24.84	20.59	48.43	60.01	13.35	26.25
<b>2003</b>	24.37	20.21	49.27	58.50	12.93	28.07
<b>2004</b>	25.59	19.98	48.16	57.19	13.63	28.73

<b>2005</b>	21.72	21.12	50.15	51.63	14.56	33.32
<b>2006</b>	19.81	21.62	51.13	48.47	14.39	36.52
<b>2007</b>	18.60	22.27	50.99	47.20	14.24	37.91

Source: 1955-1990: Population Census Results, State Institute of Statistics  
1990-2007: Provincial indicators (1980-2002), State Institute of Statistics

**Table 10. Reasons of Not Being in Labor Force, (Thousand Persons)**

	<b>Not seeking job But available to start</b>	<b>Working seasonally</b>	<b>Housewife</b>	<b>Student</b>	<b>Retired</b>	<b>Disabled, old, ill etc.</b>	<b>Other</b>	<b>Population not in labor force</b>
<b>1988</b>	423	22	8,860	564	195	813	353	11,230
<b>1989</b>	72	20	9,270	600	153	783	374	11,273
<b>1990</b>	162	146	8,927	629	212	1,339	315	11,731
<b>1991</b>	174	76	9,379	677	181	1,306	587	12,380
<b>1992</b>	139	162	9,559	768	226	1,491	654	12,999
<b>1993</b>	120	171	10,980	885	227	1,458	528	14,371
<b>1994</b>	193	153	10,623	933	231	1,428	660	14,222
<b>1995</b>	107	97	11,255	1,060	286	1,144	487	14,438
<b>1996</b>	147	93	11,668	992	278	1,187	433	14,797
<b>1997</b>	242	124	12,509	924	284	1,204	618	15,905
<b>1998</b>	221	33	12,318	1,109	347	1,174	437	15,639
<b>1999</b>	572	89	11,950	1,169	450	1,549	843	16,621
<b>2000</b>	429	339	12,339	1,144	443	1,359	1,055	17,108
<b>2001</b>	366	413	12,363	1,199	454	1,393	1,129	17,318
<b>2002</b>	364	443	12,211	1,260	541	1,505	1,132	17,455
<b>2003</b>	322	479	12,578	1,399	584	1,546	1,191	18,098
<b>2004</b>	590	321	13,301	1,347	490	1,708	1,004	18,763
<b>2005</b>	912	380	13,025	1,441	512	1,905	1,089	19,264
<b>2006</b>	1,105	310	12,780	1,560	575	2,035	1,225	19,588
<b>2007</b>	931	232	12,877	1,623	624	1,978	1,917	20,181

Source: Provincial indicators (1980-2002), State Institute of Statistics